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"I Hold Every Man a Debtor to His Profession; from the Which, as Men of Course Do Seek to Receive Countenance and Profit, so Ought They of Duty to Endeavor Themselves by Way of Amends, to Be a Help and Ornament Thereunto."—*Lord Verulam (Francis Bacon).*

Vol. XIX, No. 10 OCTOBER, 1930

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

TRADE MARK

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THE 79th ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN MIAMI, FLA., DURING WEEK OF JULY 28th. HEADQUARTERS, COLUMBUS HOTEL. LOCAL SECRETARY, G. H. GROMMET, 2364 S.W. 11th ST., MIAMI.

The 1931 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conferences of Pharmaceutical Association Secretaries and of Pharmaceutical Law Enforcement Officials will also be held at Miami, same time and place. The Plant Science Seminar will be held at Gainesville, Fla., during the week of July 21st.

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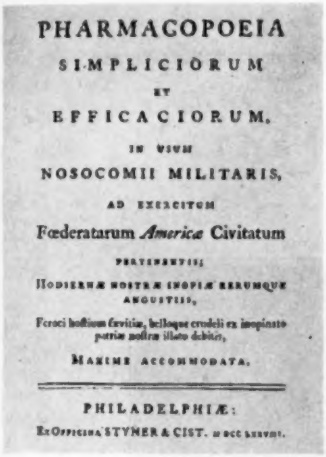


PHARMACOPOEIA

SIMPLICIORUM

ET

EFFICACIORUM,

IN USUM

NOSOCOMII MILITARIS,

AD EXERCITUM

Fœderatarum *America* Civitatum

PRÆSIDENTIS;

Hodiernæ nostræ inopiæ rerumque angustiis,

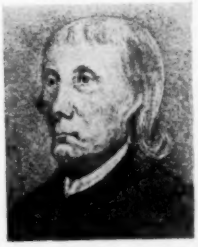
Feroci hostium sævitiæ, bellique crudeli ex inopinato patriæ nostræ illato debitæ,

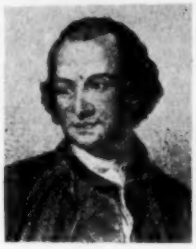
Maxime accommodata.

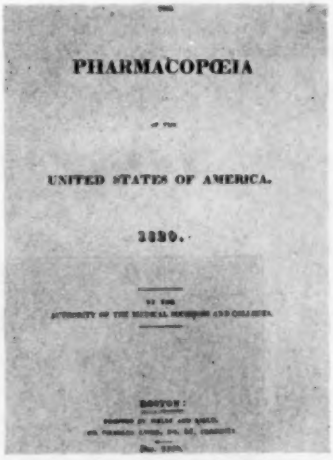
PHILADELPHIÆ:

Ex Officina STYNER & CIST. M DCC LXXVIII.

Reduced title page, American Military Pharmacopœia (1778). Reading text 2½ x 4½ inches. (Dr. William Brown.)







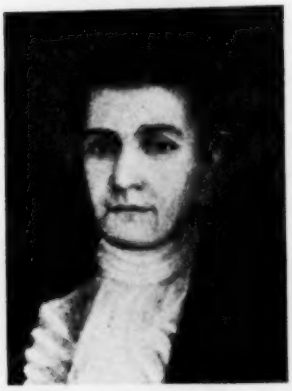
PHARMACOPŒIA

UNITED STATES OF AMERICA.

1820.

BOSTON:

Reduced title page U. S. Pharmacopœia I (1820). Reading text 3½ x 6 inches. (Dr. Lyman Spalding.)



Above, Christopher Marshall; below, Dr. John Morgan. In the group of three: left, General (Dr.) Hugh Mercer; center, Dr. Lyman Spalding; right, Dr. William Brown. In the illustration below—Washington's Headquarters at Cambridge; herein Apothecary-General Andrew Craigie had his office. On the right is shown the East Entry to the Medical Headquarters. See Editorial on "Washington Bicentenary" for further explanation of this page.

JOHN C. KRANTZ, JR.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XIX OCTOBER, 1930 No. 10

AN APPOINTMENT OF INTEREST TO PHARMACY.

Dr. Robert T. Riley, Director of Health of Maryland, has announced the election of Dr. John C. Krantz, Jr., by the State Board of Health, as Chief of the Bureau of Chemistry to succeed the late Dr. Wyatt W. Randall. An examination for this vacancy was conducted by the State Employment Commission and the appointment was made from a list of five submitted by the Commission and on which Dr. Krantz stood first.

The Department of Health of Maryland has seven bureaus, those of Vital Statistics, Communicable Diseases, Bacteriology, Chemistry, Foods and Drugs, Sanitary Engineering and Child Hygiene.

The Bureau of Chemistry examines specimens collected by the Bureau of Food and Drugs and the Bureau of Sanitary Engineering. It also conducts original research and collaborates with other bureaus in perfecting the standards for foods, drugs and water, and the methods for examining them.

Dr. Krantz is a native of Baltimore and attended the public schools, graduating from the Baltimore City College. His father is a graduate pharmacist and this gave the son an interest in pharmacy, which influenced him to enter the School of Pharmacy of the University of Maryland in 1917. He holds the degrees of Ph.G., Ph.C. and Bachelor of Pharmacy from that school. Before graduation he became an instructor and later was Assistant in Pharmacy, Associate Professor and Professor of Pharmacy during the period from 1919 to 1927. During this time, he also taught in the Dental School, in the Johns Hopkins Medical School and in the School for Nurses of the Johns Hopkins Hospital, was consulting pharmacist of the Johns Hopkins Hospital, editor of the Formulary of the Hospital, and completed the work for the degree of Master of Science in the University of Maryland.

In 1927 Professor Krantz resigned from the faculty of the School of Pharmacy to become director of Pharmaceutical Research for Sharp and Dohme and to complete his work for Doctor of Philosophy in the University, which degree was awarded in 1928 with pharmaceutical chemistry as his major subject. In his work with

Sharp and Dohme, Dr. Krantz has extended his reputation as a scholar and as a research worker of rare ability and devotion to his chosen profession, and has demonstrated that pharmaceutical research has a worthwhile opportunity as well as a wide field of application, scientific and practical. In recognition of his work, he was awarded the Ebert Prize by the AMERICAN PHARMACEUTICAL ASSOCIATION, the outstanding award for scientific research in pharmacy. He was elected a member of the Committee on Revision of the U. S. P., of which he is chairman of the Sub-Committee on Inorganic Chemicals. He is chairman of the Committee on Unofficial Standards of the AMERICAN PHARMACEUTICAL ASSOCIATION; he has served as chairman of the Scientific Section and the Section on Practical Pharmacy and Dispensing. He was elected secretary of the Biological Society of the Medical School of the University of Maryland. He has served as chairman of the Committee on Pharmacy of the Maryland Pharmaceutical Association for several years, is the founder and chairman of the Scientific Section of the ASSOCIATION, and has arranged the scientific program of the Delaware Pharmaceutical Society. Dr. Krantz has been a frequent contributor to pharmaceutical literature. He is the editor of "Simons' Manual of Chemistry" and of "Krantz's Pharmaceutical Chemistry."

The new position opens up a field of work of great importance to pharmacy, not only in Maryland but everywhere. Some years ago, the pharmacists of Maryland decided that it was important to have the laws regulating the practice of pharmacy and the quality of drugs and medicines adequately enforced. After an extended study of the situation and after consultation with Governor Ritchie, it seemed best to put all of this work under the administration of the Board of Health since this department was already charged with the enforcement of the Pure Food and Drugs Act and had the necessary inspection force and laboratory facilities. Consequently legislation was prepared and eventually enacted, making the Board of Pharmacy an examining and licensing body; requiring that a pharmacist be a member of the Board of Health and that either the Commissioner or Deputy Commissioner of Food and Drugs, in charge of the Bureau of Food and Drugs, be a pharmacist; and placing the enforcement of the laws regulating the practice of pharmacy under the Board of Health, for which a sufficient sum in the State budget was appropriated to carry out this program.

The Deputy Commissioner of Food and Drugs is a pharmacist and has charge of enforcement so far as drugs are concerned and has two full-time inspectors who are pharmacists; with Dr. Krantz's appointment as Chief of the Bureau of Chemistry, there will be two pharmacists in that Bureau, which provides a complete organization for the enforcement of the pharmacy laws of the State.

Since the Attorney-General of the State is an ex-officio member of the Board of Health, and its legal adviser, the legal department of the State takes over any prosecutions that may be found necessary, although the Board prosecutes only as a last resort. It is interesting to note that the prosecutions under the pharmacy laws have decreased as the number of inspections of drug stores has increased, showing the result of the educational policy followed by the inspectors.

It is worth emphasizing that this plan adds no cost to the pharmacists of the State except in general taxation and that the State considers it to be its duty to enforce pharmacy laws just as it enforces other laws.—E. F. K.

EDITORIAL

E. G. EBERLE, EDITOR 10 West Chase St., BALTIMORE, MD.

DOING THE BEST WE CAN WITH WHAT WE HAVE.

PERHAPS everyone will admit that if we magnified our profession to the fullest we would have a relatively greater appreciation of it; and, as a result, its opportunities would be developed to a greater extent, and as a further result—the public could have a better understanding of its worth. There are few industries to which pharmacy has not directly or indirectly contributed; in most of the divisions of science and art pharmacy has a part; certainly pharmacy has contributed largely to the achievements of medicine.

A few weeks ago, in the *New York Times*, the daughter of our late life-long member, Dr. Frederick B. Power, replied to an article which spoke with rightful enthusiasm of the success in the treatment of leprosy, but no mention was made of her father's work that developed the products that made administration of the remedial agent possible. In the article noticed by Mrs. Heimke, on "The National Institute of Health," reference is made to the beginnings of the Hygienic Laboratory, in the following quoted paragraph:

> "It was for checking up on medical products of the kind that came from such discoveries as Pasteur's and Lister's that a governmental agency which evolved into the present establishment was set up in New York in the '80s. The supervisory agency was transformed into the Hygienic Laboratory, with headquarters in Washington, early in the century. It still keeps a watchful eye on vaccines, serums and toxins, and other such products made for interstate distribution, making the investigations that guide the Secretary of the Treasury in licensing the distribution of such preparations. Places of production are inspected regularly, and tests of products are made to see that proper standards are maintained."

The place of pharmacy is readily seen in this research; looking back and forth and into the present developments one cannot fail to recognize the importance and possibilities of pharmacy, and in this work the retail pharmacies and other divisions of the drug industry share in the medical research. It is true that the facilities and purposes of the clinical, research and manufacturing laboratories are outstanding, but those who know pharmacy are aware that in the pharmacies of to-day, as in the times of Scheele, Liebig, Caventou, etc., discoveries have been made and are being made that add to the common fund of medical research and science, and the sources are often forgotten or credited elsewhere.

This brings us to the purpose of the comment. Everywhere pharmacists, druggists and manufacturers contribute, as they should, to the advancement of their home cities and institutions, and by large gifts and provisions in their wills give to worthy causes; in some of which the memorial which they sought to perpetuate becomes hidden or neglected. The AMERICAN PHARMACEUTICAL ASSOCIATION has always safe-guarded and carried out the provisions of its trust funds and it always will.

The American Institute of Pharmacy should have a large endowment for its activities. Here, those who have acquired wealth in the drug industry have opportunities for memorials, expressive of their appreciation and valuation of

pharmacy, and those whose means are more modest can have a share in the great undertaking in which their names, or those they desire to memorialize, will be placed on record with others who have shared in the development of American pharmacy. It is hoped that this brief comment will be given serious thought and result in valuing pharmacy at its best, so that the means afforded can be used to extend the possibilities of pharmacy. Without fully understanding or appreciating the need of pharmacy—the benefits it has given to the world—the right estimate cannot be placed upon its usefulness, and upon its usefulness depends its value in a practical way.

In closing, we express appreciation of the altruism evidenced and coöperation declared in the resolution adopted by our "sister" organization, or shall we say "daughter"—the National Association of Retail Druggists—at its recent annual meeting in Atlantic City; it follows:

PHARMACY ENDOWMENT.

WHEREAS, many large fortunes have been built largely through sales in retail drug stores and through other pharmaceutical activities, and

WHEREAS, the possessors of many of these fortunes have not been made acquainted with the endowment needs of pharmacy at a time when they were planning the disposition of their wealth, with the result that the proportion devoted to pharmacy, as compared to other professions and causes, is not in keeping with its importance and with its services to humanity, and

WHEREAS, the needs of the American Institute of Pharmacy in Washington, of the many schools and colleges of pharmacy throughout the land, of the necessary researches and surveys in the professional and economic phases of pharmacy, particularly in the improvement of standards, and of proper publicity for pharmacy, are very great and pressing if the profession is to fully discharge its obligations, and

WHEREAS, such endowments would not only place pharmacy in a position conforming to its importance, but would also enable it to increase its contributions to the comfort and safety of life, and

WHEREAS, it is necessary and timely that it be explained in a dignified but forceful manner, that a proper proportion of the means made in pharmacy should be devoted to its advancement, *therefore, be it*

Resolved, by the National Association of Retail Druggists that its incoming president appoint a committee of five members who shall acquaint our members with the needs of pharmacy and coöperate with them and with other associations, in making contacts with the men of large means in their respective communities to the end that these various pharmaceutical activities may receive the financial assistance that they require and deserve.

GEORGE WASHINGTON BICENTENNIAL.

BEGINNING on February 22, 1932, and continuing until Thanksgiving Day of the same year, the bicentennial of the birth of George Washington will be observed. Congress has provided for a commission, officially known as the "United States Commission for the Celebration of the 200th Anniversary of the Birth of George Washington," of which the President of the United States is the *chairman*, and associated with him are men and women of prominence. The Associate Directors, under whose management the plans are being organized and directed are Lieut. Col. U. S. Grant (3rd), and Representative Sol Bloom, of New York.

It is not the intention of this comment to discuss the celebration at length; the program, in preparation, will enlist the interest of every American, and the cele-

bration will extend to every village, town and hamlet in the country. It is to be nation-wide in its scope—the most far-flung and all-inclusive observance ever undertaken by this country.

An important feature of the general program involves the making of a great motion picture, depicting the life and principal events in the career of George Washington. In the making of the picture the producers will utilize every modern adjunct of the motion picture art, and accuracy is the aim in all historical depiction. The development in the arts, sciences, etc., will, as far as this is possible, be shown by comparison; the pursuit of the industries, and men of the times will be brought into the picture, and related literature will deal with 18th century activities and the present.

The AMERICAN PHARMACEUTICAL ASSOCIATION is making preparations for the erection of its Headquarters Building—the American Institute of Pharmacy. The hope is expressed that there will be liberal contributions to its Museum and Library during the lifetime of the donors and provisions made in wills, so that their names may be kept in remembrance and their gifts perpetually serve a useful purpose. The building site is near the Arlington Memorial Bridge which, with its approaches, is the monumental entrance into Arlington Cemetery, connecting it with the Mall.

On page 1041 of this issue an effort has been made to connect up pharmacy of Washington's time with the events of that period. The U. S. Pharmacopœia came into existence through the efforts of Lyman Spalding after Washington's death, but Dr. Spalding's earlier activities, during which period the ideas developed that led to the establishment of a national standard, preceded the passing of George Washington. The Military Pharmacopœia, prepared by Dr. William Brown, served a useful purpose in the American Army; on the page mentioned is a picture of the building in which Apothecary-General Andrew Craigie had his office. In 1829, Christopher Marshall, one of the "fighting Quakers," established a drug business in Philadelphia; his "Remembrances" is one of the most interesting and important of the contemporary records of the period covering the War of Independence. Before graduating in medicine and taking up its practice, as practitioner and member of a Philadelphia medical faculty, Dr. Morgan had been apothecary at the Pennsylvania Hospital. After he returned from Europe, where he had completed his medical studies, he declared in his lectures, in his addresses and in his writings, that physicians should prescribe medicines, and pharmacists should prepare them. During several years he was Director-General and Physician-in-Chief of the General Hospital of the American Army.

General Mercer's Apothecary Shop in Fredericksburg, Va., has been restored. The friendship and esteem of Washington and Mercer, one for the other, is of record; the former had his desk in Mercer's Apothecary shop. A sketch of Dr. William Brown by Bessie Wilmarth Gahn, a lineal descendant, and Dr. Lyman F. Kebler is printed in the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION for November 1927, page 1090. Related biographical sketches appear in the following volumes of the JOURNAL: Apothecary-General Craigie, January and February 1928; Lyman Spalding, August 1917; General Hugh Mercer, June 1926; Dr. John Morgan, June 1923.

The United States Commission referred to is seeking related information on apothecaries, apothecary shops, etc., American pharmaceutical literature of that

period and, in an effort to be helpful, we are asking all of our readers and members of the AMERICAN PHARMACEUTICAL ASSOCIATION to assist us by contributing to this wonderful celebration, so pharmacy may have a place in it. The ASSOCIATION also hopes that pharmacy will be well represented at the Chicago Exposition in 1933; therefore part of the donations received will serve a double purpose.

AGENCIES FOR INCREASING THE USEFULNESS AND EFFICIENCY OF PHARMACEUTICAL ENDEAVOR.

TWO conferences have, in recent years, been established, which serve as agencies for increasing the service and efficiency of state pharmaceutical organizations—a growing interest by and for these will result in corresponding usefulness. Reference is made to the Conference of Pharmaceutical Association Secretaries, and the Conference of Pharmaceutical Law Enforcement Officials. Both of these conferences meet at the same time and place as the AMERICAN PHARMACEUTICAL ASSOCIATION.

The purpose of these bodies is to bring together—annually, for round table discussions and for other means of acquiring information—the secretaries of various state and local pharmaceutical associations and, in a separate group, those who have to do with enforcement of drug and pharmacy laws. The interchange of ideas and debate adds to the knowledge of the individual and enables him to better carry out his duties, and put into practice the methods which he deems advantageous and followed by his co-workers in other states.

The success of any organization is largely dependent upon the initiative, energy, ability and enthusiasm of its secretary. If he is new in the office he will be helped for the Association's good by the experienced counsel of other secretaries attending the Conference; if he has been long in service he may need the inspiration and new ideas of his younger associates!

What is implied in the foregoing has related application to those who have to do with law enforcement. New ideas are gained by hearing others discuss problems affecting law and legislation, by bringing about greater uniformity in enactment and enforcement. Members of both bodies profit by the opportunities afforded by inter-association, by attending the meetings of the National Association of Boards of Pharmacy, the Association of Colleges of Pharmacy and the sections of the AMERICAN PHARMACEUTICAL ASSOCIATION. If the potential value of these Conferences were known to all pharmacists it would result in insistence that secretaries become members of the one and that delegates be designated for membership in the other. These Conferences provide effective means for initiating and promoting helpful policies, and their usefulness will be greatly enhanced by representative membership from all states and by the encouragement of those served.

The transactions of the bodies for 1930 will be found in the July number and in this issue of the JOURNAL. Careful study of these minutes will acquaint the readers with the importance of these conferences and impress the possibilities of these organizations for serving pharmacy and the drug-trade activities.

PHARMACISTS SHOULD BE UPSTANDING, INDEPENDENT FACTORS IN ECONOMIC LIFE.

PARTS OF AN ADDRESS BY GLENN FRANK, PRESIDENT UNIVERSITY OF WISCONSIN, GOLDEN JUBILEE MEETING, WISCONSIN PHARMACEUTICAL ASSOCIATION.

I am a little at sea in addressing pharmacists, even in this brief and informal manner. I hardly know whether to talk about pharmaceutical science or retail distribution. I realize that, as merchandizers, you are professionally passing through a difficult transition. The hard time the apothecary is having to hold his own in the day of the drug store, with its bewildering miscellany of wares, does not make him unique among the rest of us. All trades and all professions are under the same stress of transition. We are in an age marked by increasing centralization in all fields of enterprise. The transfer to centralized laboratories of the work that the old apothecary did in his independent shop is simply part of the widespread centralizing tendency of our time. I have been saying to the retailers and to the farmers of Wisconsin that it behooves us to look facts in the face, whether we like them or not, and, if centralization is inevitable, not to delude ourselves into thinking that simply shouting about the glory of the old individualism will help us much, but set about the devising of ways and means of meeting the centralizing tendency of the time.

The American historian of the future will, I suspect, say that the decade from 1925 to 1935 saw the death struggles of an old individualism and the birth-throes of a new groupism throughout the economic life of America, a culmination that had its roots, of course, in earlier years. The symbol of the old America was the pioneer with his emphasis upon individualism. The symbol of the new America is the corporation with its insistence on group action. I do not attempt here to pass judgment on this tendency. I simply record it.

Evidence of this transition from individualism to group action lies so plainly on the surface of American life that he who runs may read. More and more all phases of American life tend to follow the principle of combination. More and more the chance, the choice and the conduct of the individual American is determined by associations, organizations and combinations. A lush growth of legal corporations is seen on all hands. Gigantic mergers are the order of the day. Popular opinion regarding the Sherman Anti-Trust Law is less riotous than it once was, if, indeed, it has not reversed itself. Factories, utilities, railways, banks, stores, theatres, newspapers—all head toward larger and larger operating units through merger and syndication. And where direct merger is impossible, a hundred and one indirect means of interlocking the fortunes of smaller units of enterprise are resorted to. More than three-fourths of the capitalization of all the banks in the United States is to-day lodged in the hands of a dozen financial concerns. This control of three-fourths of America's bank capitalization implies at least a marked influence on the credit policies of the remaining fourth.

The upshot of all this is that American life daily drifts away from the old individualism toward a new groupism. Some of the most astute and liberal intelligences of our time are convinced that this drift is inevitable, and that legislation can do little more than to heckle and harass its advance. I find John Dewey, for in-

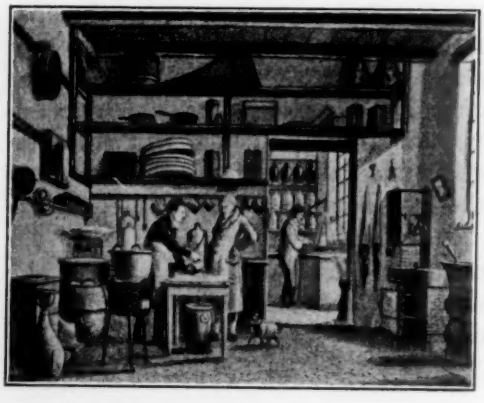
stance, saying, "Political control may be needed, but the movement cannot be arrested by legislation. . . . The forces at work in this movement are too vast and complex to cease operation at the behest of legislation." I agree with Dr. Dewey. Unless I am far afield in judgment, the America of to-morrow will act through highly organized groups. Whether we like it or not, this seems clearly in the cards.

The problem that must now be faced is this: What is to be the nature of the control of this group action? As I see it, that control can be either of two types. It can be a feudalized control or it can be a federated control.

A feudalized control will mean an ever narrower control by the few. It will mean that the individual merchant must surrender to chain systems controlled by a few owners from a few centers. It will mean that banks, factories, theatres, newspapers and the other basic enterprises of our time must follow suit. In some fields this feudalized control may be not only necessary but salutary; but anything like a wholesale application of it to the total economic life of the nation will mean not only the death of the old individualism but of all individualism.

There is the alternative of a federated control of this inevitable group action. I mean control by the federated action of otherwise independent units of enterprise. I mean the sort of control exercised by the United Grocers on the Pacific Coast, who, by pooling their resources and their resourcefulness, have beaten the chain stores at their own game, without surrendering any of the essential virtues of their former isolated independence. Federated control of group action means taking advantage of all the benefits of group organization without submitting to the tyrannies of a new feudalism. It means the death of the old individualism, yes! But it means the birth of a new individualism surrounded by the protection of coöperative strength.

All this has direct bearing upon a problem the pharmacists of Wisconsin face. And the point toward which I have been leading is simply this: If the pharmacists of Wisconsin find themselves facing an increasingly difficult competition from chain drug stores, there is no reason why, as independent pharmacists, they should surrender to this competition, or cease to be upstanding, independent factors in the economic life of this Commonwealth, because there is no feudalized control in America that cannot be matched by a federated control through the joint action of independent Americans.



LABORATORY OF APOTHECARY D'AILLY.

Joseph Bienaimé Caventou carried on an important pharmaceutical business in Paris for many years. His fame rests largely on his association with Joseph Pelletier in the discovery of quinine in 1820. The latter was one of the most brilliant workers in pharmacy. The picture herewith is from an old oil painting and shows the factory in which quinine was manufactured soon after its discovery by Caventou and Pelletier. It is of interest at this time because of the 300th Cinchona Anniversary, to be celebrated by the Missouri Botanical Gardens this fall.

SCIENTIFIC SECTION

FURTHER STUDIES ON THE SALVARSANS AND RELATED COMPOUNDS.

BY C. N. MYERS.

In 1918 Myers and DuMez (1) pointed out that arsphenamine products of different manufacturers marketed in this country are not all uniform with respect to either their chemical or their physiological properties. Clinical evidence at that time corroborated the laboratory data. Many of the preparations showed the presence of sulphur compounds. Quantitative determinations of various brands of arsphenamine disclosed marked variations in the arsenic content. More than twenty specimens were examined with a deviation of approximately 0.6 per cent. These variations later led to the study of the volatile constituents of these products. Reference to these assays indicated a remarkable degree of uniformity of the original Ehrlich product. Examination of the various brands of neoarsphenamine also revealed a most unusual lack of regularity in arsenic content and in general physiological and chemical properties, a condition which to a considerable measure exists even to the present time.

Later the author pointed out the relation of physical properties to toxicity, and discussed the subject of colloidal chemistry as related to the action of the salvarsan series. This has led to a great deal of constructive research on the physical characteristics of this group of arsenicals. The interesting observation was made by Lake in our laboratory that if a solution of salvarsan in the form of the disodium salt is allowed to stand 30 minutes, there is a 20 per cent reduction in toxicity, indicating a change from the semicolloid stage to that of a pure solution. Hooper in unpublished data has shown that even in higher doses 60 per cent of the animals will survive on a balanced and regulated diet. According to their colloidal character, the various arsenicals may be arranged in the following order between the true colloids and the crystalloids: collargol (colloid), silver salvarsan, neosalvarsan, salvarsan dihydrochloride, salvarsan freshly alkalinized, salvarsan sodium, silver nitrate (crystalloid). Various impurities in salvarsan and its analogous compounds have been overemphasized as a causative factor of reactions, usually by those unfamiliar with clinical practice. A most careful statement on this subject has been made by Kolmer (2) in his treatise "Chemotherapy with Special Reference to Treatment of Syphilis," a book worthy of earnest perusal. In previous studies the author conveyed the information that in commercial salvarsan there were volatile constituents which, according to calculation, as a group corresponded to two molecules of water of crystallization. It has not been the writer's conception that a semicolloid carries water of crystallization but everyone familiar with the subject knows (as confirmed by the earlier reports of Myers and DuMez) that products have appeared on the market with an arsenic content as low as 29 per cent and as high as 32.3 per cent.

Every reasoning individual is aware that there is a cause for this deviation. Goebel (3), Raiziss (4), Gavron and Falkov (5), Kober (6), Rieger (7), Fargher and Pyman (8), and Myers (9) have expressed views on this subject, from the toxico-

logical point of view. The presence of arsenoxide is so low as to deserve little consideration. Combined sulfur derivatives are also present in minute amounts; in fact they favorably influence the therapeutic activity. Commercial salvarsan contains approximately 31.56 per cent arsenic, either by gravimetric analysis or by the official test described by the author. Various brands of arsphenamine are examined for arsenic and then each specimen is dried *in vacuo* at 110° C. at a pressure of 29.50–29.75 inches. The weight of the specimen is known, the arsenic and the arsenoxide content are found by actual determination. The toxicity studies are made simultaneously on the original material and on the dried specimen. The product is then dried for 4 hours with a trap containing a known amount of tenth-normal silver nitrate which takes out the hydrochloric acid. An additional trap is added and maintained at freezing temperature for the purpose of examining for methyl alcohol. Kolmer on page 599, states:

> "*Toxicity of Methyl Alcohol and Inorganic Impurities.*—From the standpoint of toxicity, the importance of methyl alcohol has been overemphasized. In the small amounts that may be present, it cannot be held responsible for toxic reactions and is of chief interest in relation to the chemistry of arsphenamine and especially as an explanation in part for the presence of less than the theoretical amount of arsenic, as discussed above. I have found that white rats can bear without apparent injury intravenous injections of methyl alcohol in doses as high as 1 cc. of 10 per cent solutions per kilo, which is much larger than the traces to be found in arsphenamin."

After drying has taken place for 4–6 hours the specimen is reweighed under analytical precautions. Arsenic, arsenoxide and toxicity determinations are then made. The solutions give the hydrochloric acid content. From the total loss in weight the calculated arsenic content is obtained. Comparison is then made with the theoretical arsenic content which is 34.2%. In other words, arsenic found, arsenic calculated and the theoretical value are obtained at once.

A comparison of several brands has shown the presence of comparatively large amounts of inert non-arsenic containing material which undoubtedly comes from carelessness of manufacture and materially concerns the solubility of the arsphenamines. The following table illustrates this point:

Control.	Arsenoxide. As before.	Arsenoxide. After.	Arsenic before heating.	Total volatile constitutent per cent.	Free HCl.	Arsen. anhy.	Arsen. calcd.
a	1.3	1.5	31.65	9.9	0.280	33.80	...
				9.1	0.285		
b	1.2	1.5	31.65	7.36	0.270	33.67	34.16
c	0.8	1.0	31.40	9.40	0.206	34.10	34.60
d	0.7	0.9	31.54	8.30	0.172	34.20	34.20
e	0.7	0.9	31.40	8.50	0.237	34.20	34.30
f	0.6	0.9	31.20	8.50	0.201	34.10	34.10
g	0.6	0.8	31.28	9.05	0.230	34.22	34.40
h	1.1	1.1	31.67	4.01	0.193	32.83	32.66
i	1.1	1.1	31.87	5.68	0.120	33.50	33.80
k	1.0	1.2	31.00	7.65	0.134	33.97	33.57
l	1.1	1.1	30.10	8.00	0.171	33.07	32.72
m	1.1	1.2	30.05	9.02	0.227	33.41	33.02

The foregoing table indicates that no oxidation has taken place as a result of vacuum drying when measured by the arsenoxide test and also by toxicological

examination. The hydrochloric acid content of this group of products shows a fair degree of uniformity in the percentage of mechanically held acid. As previously stated the theoretical arsenic for anhydrous salvarsan is 34.20 per cent and the last two columns reveal interesting data on this subject.

It so happens that the excess hydrochloric acid in these specimens is no serious factor in the alkalization of the preparations. However, occasionally products are found with which comparatively large excesses of alkali are required to produce the disodium salt. This factor, coupled with water that has absorbed much carbon dioxide, may be the cause of disastrous results clinically. The presence of the inert impurities and excess acid may serve as a factor influencing the formation of either fine or coarse grained particles in the process of alkalization. Officially this group of compounds is examined only for toxicity and arsenic content.

A word of warning should be added at this time against the use of either warm, hot or boiling water to which the alkali is added, for the reason that decomposition takes place with the resulting formation of arsenoxide.

It is not uncommon to find that voluminous pamphlets are distributed to clinicians that neither represent scientific accuracy nor convey helpful information to the physician or patient. After a little serious reflection, one may well ask what convincing clinical literature can be offered to a physician in behalf of a given product unless scientific evidence can be adduced that the product measures up to the Ehrlich ideals? This point was so emphatically brought to the attention of the English manufacturers and clinicians that a demand was made by the British Medical Research Committee for a uniform product with high potency. Careful study showed that to attain these ideals, a definite standard must be adopted as regards manufacture and therapeutic activity. To reach this goal the product originated by Ehrlich was selected as a standard, with which all arsenicals were made to conform. Not until better arsphenamines are made than those suggested and studied by Ehrlich will the time arrive when our standards need revision. It is the writer's opinion that the clinician should be aided to treat syphilis with the arsphenamine preparations rather than be forced to listen to a long discussion of unverified chemical theories. In this connection reference is made to a few salient statements by H. H. Dale (10) of the British Medical Research Committee. The same ideals were advocated by me several years ago and now there are a few who have tardily accepted them in principle, though not in all instances as a scientific fact.

"TWO DISTINCT CLASSES OF NEOSALVARSAN TYPE."

"A short experience with the application of this test sufficed to indicate that the preparations of the neosalvarsan type submitted for test fell into two well-marked classes. On the one hand were those which resembled the German product more or less closely in appearance, in solubility and in the rapidity with which their solutions underwent decomposition if left standing exposed to the air. On the other hand, there were others which had an advantage over the German product in their extremely free and rapid solubility, and which gave evidence of much greater stability in solution. Preparations of the former class had a border-line toxicity from the point of view of the test; many samples just passed it, and many others failed. A slight raising of the standard would have excluded nearly all. Those of the latter class—the freely and immediately soluble type—passed the routine test with an almost unbroken regularity; when, experimentally, sample batches of this type were tested on higher doses, it was found that many were tolerated in a dose of 0.5 mg., some even in a dose of 0.6 mg. per Gm.; *i. e.*, the toxicity was often only one-half of that at which they would still have passed the official control.

"No question of a control of therapeutic efficacy arose at this time. It would have been impossible, in any case, to carry it out with the staff available under war conditions. From the clinical side there was no hint of dissatisfaction; here again, in the hurry to get men through their treatment and return them to duty, no adequate control of results was possible. The practitioner appreciated the additional convenience afforded by rapid and perfect solubility, and the freedom from constitutional reactions, even when highly concentrated solutions were injected. The demand for the more soluble and less toxic type of product grew very rapidly, until manufacturers whose endeavor had been rather to copy the German product found themselves forced to modify their process, so as to produce a more soluble type. Therewith the toxicity of their products fell likewise to the lower level."

Some may raise the question as to whether this can be done and the answer is in the affirmative. Foreign preparations were studied in the following manner:

"First Comparison of British and German 914 Products.

(P) = Preparation
(Ma) = Maximum tolerated dose
(Mi) = Minimal curative dose
(RD) = Ratio of curative dose to tolerated dose

(P.)	(Mi.)	(Ma.)	(RD.)	(P.)	(Mi.)	(Ma.)	(RD.)
German.				British.			
A1	0–02	0–3	1:15	C1	0–06	0–5	1:8
A2	0–02	0–3	1:15	C2	0–03	0–5	1:16
A3	0–02	0–3	1:15	C4	0–05	0–5	1:10
British.				C5	0–04	0–3	1:7–5
B1	0–04	0–4	1:10	C6	0–04	0–4	1:10
B2	0–05	0–3	1:6				

The results are obvious to one trained or even untrained in this work.

To confirm these points the same committee made a study of the action of the same products on clinical material, with complete confirmation of the experimental findings as shown in the following table:

Preparation.	Minimal curative dose of mice infected with T. Equiperdum.	Proportion of human cases in which spirochaetes were detected 18–20 hours after injection of 0.45 g.
B3	0–015	0 out of 6
A2	0–02	0 out of 4
A3	0–02	1 out of 6
C3	0–02	1 out of 6
C2	0–03	3 out of 6
B2	0–05	9 out of 10

The infection leading to syphilis is a serious one resulting in consequences which are important from clinical as well as economic points of view. It concerns the daily well-being of each and every one. Picture for yourself the many situations where decisions involving life and death must be instantaneously made. The mere failure for a moment of the engineer in obeying a signal, the lapse of mental activity on the part of the dispatcher and a host of similar conditions may plunge us precipitously into eternity. Therefore the "best" is mandatory in the treatment of this disease.

The first studies carried out in this country on the composition of the neoarsphenamines were those by Raiziss and his co-workers in which they definitely es-

tablished that there were two types of drugs. It is unnecessary to defend or criticise their mode of procedure because on a comparative basis the findings show distinct variations. The same may be said of the investigations of Macallum (11), Elvove (12), Freedman (13) and De Myttenaere (14). Of particular importance is Elvove's statement that in some brands of so-called neoarsphenamine there is a very large amount of sulpharsphenamine-like impurity. Values as high as 90% of this impurity have been found and yet the product is labeled as neoarsphenamine, a condition which should not exist. The combined researches of the above investigators have demonstrated the existence of at least three varieties of neoarsphenamine and it is difficult to understand how all can be described as superior. Furthermore, no extensive clinical literature is available for any type except the Ehrlich product. It would, therefore, seem evident that these products are largely devoid of supporting evidence. It has been my observation that syphilitics who have been treated with certain arsenicals have become progressively worse. It should be pointed out that the so-called neoarsphenamine preparations are officially controlled in respect to arsenic content and toxicity only. Some manufacturers carry on an experimental therapeutic control. During the past few weeks examination of a few types of neoarsphenamine has been made showing that some are essentially monosubstituted products, others disubstituted; another group is approximately half and half, and a fourth contained 81.6 per cent of a sulpharsphenamine-like impurity. Fordyce, Rosen and Myers (15, 16) have pointed out that disturbing late results in syphilis were associated with localization of the arsenic instead of distribution, and this in turn was related to chemical constitution.

Everyone who is familiar with the treatment of syphilis has noted the incidence of purpura, dermatitis and jaundice, as well as encephalitis and peripheral neuritis. These reactions are late and usually have some connection with the arsenical employed. On the contrary, early reactions are due to errors in technic in the preparation and administration of the drug.

Nothing has been said in regard to sulpharsphenamine. In a recent report of Stokes, it is stated that the only excuse for its existence is in the treatment of obese syphilitic patients. This is an opinion shared by a large number of clinicians for many years.

To bring to a conclusion, the ideas briefly alluded to at this time, it is evident that there is great need for uniformity of the neorasphenamine preparations so that the treatment of syphilis may be standardized and the results of one clinician be placed on a comparable basis with those of another in a different locality. Syphilis has become an economic problem and one closely related to public health. The most efficient remedy is a necessity, and thus far no one has discovered any preparations superior to those originated by Ehrlich. It is a matter of common knowledge that the League of Nations is and has been using the latter products as a standard for comparing all others. It is my opinion that there is a real necessity for the official control of the therapeutic activity of all antisyphilitic remedies as well as control of toxicity and arsenic content. The U. S. Public Health Service should willingly and fearlessly assume this responsibility for the protection of patients and clinicians. This would lead to uniformity. The present lack of efficiency of certain types of arsenicals is bound to lead to unsatisfactory results in late cases and thus give rise to unfavorable criticism about the efficacy of all treatment. If a clinician

can take the time and trouble to properly prepare solutions of salvarsan, this drug is the one of choice. For general use, neosalvarsan has been more widely adopted because of the greater convenience. In combined convenience and potency, silver salvarsan is unexcelled. It produces no systemic reaction and possesses marked efficiency in eradicating the invading organism.

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"No one knows so well as the physician what a debt we owe to the careful, intelligent and sincere pharmacist, and no group should coöperate so readily and enthusiastically as the doctors in making the 1930 Pharmacy Week a big success."—*Clinical Medicine and Surgery.*

"In Medicine, Dentistry and Pharmacy, or any business for that matter, we have those who thoroughly understand the theory but never get anywhere in practice. We have those possessing the art who look down upon anyone who takes time to try and master theory. These artists stand in the way of their natural progress."—RALPH R. PATCH.

STUDIES ON STRYCHNINE.

2. The Action of Certain Substances in Masking the Taste of Strychnine.

BY JUSTUS C. WARD* AND JAMES C. MUNCH.[1]

The threshold for detection of the bitter taste of strychnine in distilled water was 5.4 micrograms; when dissolved in Denver city water the threshold was found to be 6.5 micrograms. This discrepancy directed the authors' attention to the possibility of masking the bitter taste of strychnine by the addition of various salts, sugar and other substances. The method of determining the threshold limen was described in a previous communication (2).

A series of solutions of strychnine in the form of the alkaloid, the sulphate and the hydrochloride were prepared in various solvents. The minimum quantity of strychnine in terms of the alkaloid which was just detected is given in Table I.

Table I.—Threshold Taste Limens of Humans for Strychnine.

Results in Micrograms of Alkaloid.

Solvent.	Concentration per cent.	Strychnine in form of: Alkaloid.	Sulphate.	Hydrochloride.
Distilled Water	.....	5.6	5.4	5.8
City Water	.....	6.1	6.4	6.3
Sodium Bicarbonate	0.000,053	5.3	....	....
Alum	0.000,63	6.3	....	....
Borax	0.000,69	6.9	....	....
Sodium Chloride	0.6	7.1	7.0	8.5
Sodium Chloride	0.9	7.2	7.2	9.5
Saccharin	0.000,019	7.5	....	....
Sucrose	1.0	8.9	7.2	7.2
Sucrose	5.0	11.1	8.5	9.5
Sucrose	10.0	17.5	14.8	14.3
Yerba Santa	1.0	16.7	....	....
Yerba Santa	5.0	36.4	....	....

Using distilled water as a solvent the threshold of strychnine in the form of the sulphate was found to be 5.4 micrograms; as the alkaloid, 5.6 micrograms and as the hydrochloride, 5.8 micrograms. When dissolved in Denver city water the thresholds were found to be 6.4 micrograms, 6.1 micrograms and 6.3 micrograms, respectively. When dissolved in 0.6 and 0.9 per cent sodium chloride solutions the thresholds were increased to between 7.0 and 7.2 micrograms for strychnine in the form of the alkaloid or of the sulphate. For the hydrochloride the thresholds were greatly increased, namely, 8.5 and 9.5 micrograms. The authors believe that the greater masking action upon the hydrochloride resulted from the "common ion effect."

Greater masking was produced by one, five and ten per cent solutions of sucrose. The degree of masking was the greatest for the alkaloid; while it was less, and approximately the same for strychnine in the form of both the sulphate and the hydrochloride. The reason for this discrepancy is being investigated further.

* Associate Pharmacologist.

[1] Consulting Pharmacologist, Control Methods Research, Bureau of Biological Survey, U. S. Department of Agriculture.

A second series of experiments was then undertaken to determine the degree of masking effect produced by the use of sodium bicarbonate, alum and other products with results given in Table I. Only strychnine alkaloid was used in this series of tests. It was found that sodium bicarbonate in an amount equal to one-half of the quantity of strychnine present somewhat intensified the bitter taste. The threshold was found to be 5.3 micrograms. A number of tests were conducted which demonstrated that this intensification was real and not apparent. The authors do not believe that this intensification is a function of the hydrogen-ion concentration, since borax masked rather than intensified the bitter taste. The greatest degree of masking was produced by an extract of yerba santa. With a five per cent solution of yerba santa the threshold quantity giving just detectable bitterness was increased to 36.4 micrograms, which is approximately seven times the threshold for strychnine in distilled water.

In a further study of the "common-ion effect" investigations were undertaken with strychnine in the form of the sulphate, hydrochloride and nitrate. Solutions were prepared using potassium, sodium, calcium and magnesium sulphate, hydrochloride and nitrate as solvents. For uniformity, concentrations of 0.1 per cent of the SO_3, Cl and NO_2 anions were prepared. These test solutions were tasted in accordance with the authors' technic to determine the threshold of bitter taste with the results given in Table II.

TABLE II.—THRESHOLD TASTE LIMENS OF HUMANS FOR STRYCHNINE AS SULPHATE IN SALINE SOLUTIONS.

Results in Micrograms of Alkaloid.

Anion.	Cation. Potassium.	Sodium.	Calcium.	Magnesium.
Sulphate	5.5	6.2	...	9.3
Chloride	5.6	5.5	6.3	10.0
Nitrate	5.6	5.9	7.2	9.7
Average:	5.6	5.9	6.8	9.7
Per cent of normal threshold	102	108	125	178

The average quantity detected in the potassium solutions and in the sodium solutions was 5.6 and 5.9 micrograms, respectively. These values are but slightly larger than the threshold in distilled water, indicating only 2 per cent and 8 per cent masking efficiency. Calcium chloride and nitrate solutions gave an average of 25 per cent in masking efficiency. Magnesium salts showed a materially greater efficiency. The average for the three salts tested was 9.7 micrograms, or a masking efficiency of 78 per cent, which proves that magnesium exerts the most potent masking action, followed in order by calcium, sodium and potassium.

When the threshold quantities were determined for the sulphates, chlorides and nitrates, no particular or significant differences were noted in the average values. It was concluded that the cations and not the anions were the significant factors in masking the taste of strychnine. The conclusions of Parker (1) regarding the lack of masking effect of potassium nitrate and of magnesium sulphate upon the bitter taste at the base of the tongue were not confirmed in our work.

In this series of experiments, attention was also directed to the time interval between application of the solution to the tongue and the first perception of a bitter taste. Tests were conducted upon three to five individuals. Individual sensitivity

of the taste buds was observed to vary considerably, although the minimum threshold could in no way be associated with sensitivity of any given area. In some individuals the bitter taste was first observed at the tip, in others at the base or sides of the tongue and on the soft palate. This difference in locus was not associated with differences in time of perception nor with differences in acuity. The interval in seconds between the application and the first detection of bitter taste ranged from five seconds to forty seconds. The average values ranged from twelve to twenty-eight seconds. The detailed report of these time intervals is given in Table III.

TABLE III.—SPEED OF RECOGNITION OF BITTER TASTE OF STRYCHNINE AS SULPHATE.

Time in Seconds.

Product.	Subject Number. 1	2	3	4	5
	10	20	30	10	15
Distilled Water					
Potassium:					
Sulphate	20	20	20	8	..
Chloride	15	25	25	..	..
Nitrate	5	35	20	..	..
Average	13	27	22	8	..
Sodium:					
Sulphate	5	12	40	10	4
Chloride	10	22	40	20	..
Nitrate	20	20	25	..	..
Average	12	18	35	15	4
Calcium:					
Chloride	5	20	10	..	..
Nitrate	30	25	30	..	..
Average	18	22	20	..	..
Magnesium:					
Sulphate	5	20	15	15	..
Chloride	30	22	10	..	..
Nitrate	10	20	15	..	..
Average	15	21	13	15	..
Average for cations	14	22	22	13	4

No significant effect in delaying the time when the bitter taste was first noted could be attributed to the anion or to the cation present. The correlation coefficient between the threshold quantity detected and the time until the bitter taste was first noted was found to be -0.03 ± 0.11. This demonstrates conclusively the lack of relationship between perception and rate of development of taste.

CONCLUSIONS.

1. The bitter taste of strychnine may be masked by a number of chemically unrelated substances: salts, sucrose and yerba santa extract.

2. The cation and not the anion is the significant factor in the masking action of salts.

3. Of the cations studied, the masking efficiency decreased in the order magnesium, calcium, sodium to potassium. The average masking action of magnesium salts was 78 per cent; calcium 25 per cent; sodium 8 per cent and potassium 2 per cent.

4. No consistent masking effect could be attributed to the anions studied.

5. Taste buds for detecting bitterness are located on the tip as well as on the base and sides of the tongue.

6. No relationship was found between acuity and speed of perception of the bitter taste of strychnine ($r = -0.03 \pm 0.11$).

7. The addition of sodium bicarbonate increases the bitterness of strychnine.

8. The addition of five per cent yerba santa extract increased the threshold of strychnine from its normal value of 5.4 micrograms to a value of 36.4, or approximately seven times the threshold concentration in distilled water. This was the most efficient masking action observed.

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LABORATORY NOTES ON ALCOHOL DETERMINATIONS.*

BY R. E. SCHOETZOW.

While, in general, the determination of alcohol in pharmaceutical preparations appears simple, yet difficulties do arise. At times, due to "bumping" and foaming on distillation, or to difficulties encountered in removing volatile substances, it appears that it is art, not science, that is required to make the determination. Some of our experiences may be of interest to others. Our methods, of course, are based on the method given in the tenth revision of the United States Pharmacopœia. This method is a general one. The Pharmacopœia gives appropriate steps to be taken, when some substances are present, but it seems to us that the next Pharmacopœia might with benefit give more detailed directions, perhaps a method for each class of products such as, spirits, liniments, tinctures, fluidextracts and collodions.

The first step in the Pharmacopœial Method is the distillation of the alcohol from the preparation, which has been diluted with an appropriate amount of water, but some mixtures such as Tincture Benzoin Compound, will "bump" violently on being distilled. They will "bump" so violently that the liquid may pass over into the condenser, or that the apparatus is broken.

We have tried all the ordinary remedies, such as glass beads, broken porcelain, etc., without much success. We do find, however, that if an alkali is added, not an excess since that would cause foaming, but an amount sufficient to combine with the resins present that, after allowing the mixture to stand for some time, the distillation will proceed quietly. We have found Milk of Magnesia with its low soluble alkalinity to be very suitable for use as an alkali.

Other preparations, like the Soap Liniments, or Fluidextract of Sarsaparilla, will foam to such an extent that the distillation cannot be performed. The addition of capryllic alcohol, will restrain the foaming, but not sufficiently. We have found, however, that calcium chloride added to slight excess will by precipitating or combining with the foam-producing constituents, enable the distillation to be carried out successfully.

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* Scientific Section, A. PH. A., Baltimore meeting, 1930.

It may seem obvious that "bumping" and foaming are due to opposite conditions and that by bringing the mixture to an intermediate condition with alkali or acid or calcium chloride that the proper mixture for distillation may be obtained.

The Pharmacopœia directs in the case of Tincture of Iodine that the Iodine be decolorized by zinc dust or sodium thiosulphate; in the latter case, to add several drops of Sodium Hydroxide T.S. to prevent sulphur compounds from distilling over. We find sodium thiosulphate to be quicker in effect than zinc dust. For a considerable time, however, we were puzzled by the fact that our distillate was acid or contained sulphur even when we added several cubic centimeters of Sodium Hydroxide T.S. before distilling. Eventually, we found that this occurred only when we had used an excess of thiosulphate.

We were unable to satisfactorily determine the alcohol in Spirit of Nitrous Ether by following what one would assume to be the U. S. P. Method that is by distillation, shaking out the distillate with petroleum benzin and redistilling. But, if we destroyed the ethyl nitrite before distillation, as in the pharmacopœial assay with potassium iodide and sulphuric acid, decolorizing the iodine freed with sodium thiosulphate, using the above-mentioned precautions, a satisfactory result was obtained. It is, of course, necessary to calculate from the ethyl nitrite assay, the amount of alcohol produced in the reaction and subtract this from the amount of alcohol found.

The Pharmacopœia directs that after distillation volatile oils be removed by extraction with petroleum benzin. It seems necessary to be careful of the kind of petroleum benzin used. At one time, we found obviously high results coincided with the use of a petroleum benzin, whose distilling range exceeded that of the U. S. P. More accurate results were attained when we redistilled the petroleum benzin and used the fraction distilling within the U. S. P. X range, 35° C. to 80° C.

In simple mixtures of volatile oils and alcohol, it seems unnecessary to follow the U. S. P. in distilling, extracting the distillate with petroleum benzin and redistilling. Equally good or better results may be obtained by first extracting the volatile oils with petroleum benzin from the spirit, diluting with the proper amount of water and then redistilling. This saves one distillation.

On preparations like Camphorated Tincture of Opium, containing camphor, we are not able to obtain clear distillates by the official method of distilling, extracting with petroleum benzin and redistilling. If these distillates are used for specific gravity determinations, low alcohol percentages result, but by adding alkali to the distillation mixture and allowing it to stand over night before distilling, fairly clear distillates are obtained.

There are other preparations containing volatile principles with which we are not able to obtain clear distillates. Usually with these, we do not obtain clean and sharp separations during the petroleum benzin extraction, and hazy or cloudy distillates are obtained in the second distillation. It is now our custom to add magnesium carbonate to the alcoholic mixture after extracting it with petroleum benzin and, after thorough agitation and chilling, to filter and redistil. This is usually quite successful in producing clear distillates, which are suitable for specific gravity determinations.

The U. S. P. X states what the alcoholic strength of the collodions should be. But no method given therein seems applicable to an alcohol determination in

such a preparation, because of interference from the ether present. Someone has suggested that the ether be removed by warming the product or the distillate so that the ether will be driven off, but not high enough to lose any alcohol, but that does not seem to be a very sound analytical procedure. If the alcohol content of collodion is a subject of enough importance, I believe that considerable work will be necessary in order to develop an accurate method.

We present these few notes on alcohol determination not only because we hope they may be of interest to others but, also, because they may show that in preparing the next Pharmacopœia the alcohol determination methods should be given in greater detail.

REACTION OF BISMUTH MAGMA N. F. V.*

BY K. W. SMITH AND R. E. SCHOETZOW.

The Fifth Edition of the National Formulary, in the instructions for making this product, directs that it be washed with distilled water "until the washings cease to react with phenolphthalein T.S." The magma is then drained and made up to the correct volume with distilled water.

In describing the qualities of this product, the National Formulary states, "It is neutral to litmus paper and phenolphthalein T.S." This can only be interpreted as meaning that the Magma itself is neutral to litmus and phenolphthalein T.S.

We have long been of the opinion that this statement is wrong. We believed that a magma correctly made—its washings neutral to phenolphthalein—would, itself, still be alkaline to litmus and phenolphthalein T.S.; but that its supernatant liquor or a filtrate from the magma would be neutral.

To verify our opinion we prepared two small batches of bismuth magma, strictly following the N. F. V procedure, washing as directed, until the washings ceased to react with phenolphthalein T.S. The product, however, as we anticipated was alkaline to litmus and phenolphthalein while its supernatant liquor or a filtrate from it was neutral to both.

Since it might be thought that the National Formulary did not direct a sufficient amount of washing, we subjected these two magmas to further washing with a relatively large amount of water. But the result was still the same—the product was alkaline to litmus and phenolphthalein test solution.

We recommend then that, at the next revision of the National Formulary the neutrality statement be changed to read "When filtered bismuth magma should yield a filtrate neutral to litmus and phenolphthalein test solution."

ANALYTICAL LABORATORIES,
CHEMICAL & PHARMACEUTICAL DIVISION,
E. R. SQUIBB & SONS.

"Mystery is the fundamental curse of medicine; evasion and secrecy are criminal. The best way to help any human being is to help him help himself. The man who is evasive in his dealings with his patient is either dishonest or ignorant, or both."—F. B. MOOREHEAD, M.D.

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* Scientific Section, A. PH. A., Baltimore meeting, 1930.

POLYPODIUM OCCIDENTALE.*

BY LOUIS FISCHER AND F. J. GOODRICH.

Licorice fern, a plant named as early as 1781 by Linnæus and later by Kellog, Eaton, Maxon and Jepson, appears never to have been subjected to an examination. Its early use as a flavoring in tobacco, as an alterative and as an antisyphilitic, and its characteristic licorice taste led us to conduct experimentations upon the drug. Its characteristic flavor, although somewhat masked by a slight and bitter taste, is similar to that of *Glycyrrhiza glabra*. Since the official licorice is universally used in prescriptions and proprietaries it seemed that there would be some advantage in substituting for it the licorice fern, which grows on the Pacific Coast, and the latter was studied with this idea in mind.

The licorice fern used in this analysis has had varied names. Hooker (15) in 1840 named it after the European species, calling it *Polypodium vulgare occidentale*. In 1854, Dr. A. Kellog (1) described and named it *Polypodium falcatum*. D. C. Eaton (2), in 1856, described a specimen of the fern, sent from Southwestern Oregon, and designated it as *Polypodium glycyrrhiza*. Maxon (6) gave it the name *Polypodium occidentale* in 1904. Jepson (20) termed it *Polypodium vulgare* L. **var.** *occidentale* Hook.

The fern is most abundantly found along the Pacific Coast, ranging from Alaska to California. Swan (3) believes that he saw it in Massachusetts and Alabama. It grows on old logs and trees, and is most commonly found vegetating in moss on animate maples, sometimes on rocks and stumps, in damp shady places.

Licorice fern has been used by some persons to flavor tobacco, and has been said to be an excellent alterative. The belief of Swan (3) is that its medicinal properties are equal to those of sarsaparilla. It has a sweetish bitter taste and a decoction is not unpleasant. The natives (1) highly esteemed it as a medicine, and thought it to be an antisyphilitic. The rootstocks are often gathered by children for chewing because of the strong licorice taste. The roots (20) are also roasted as confection. The ancients (3) used a polypody growing upon oak trees for the cure of melancholy and madness; this may have been the licorice fern.

The fern has a creeping, tuberculate rhizome varying greatly in length according to the conditions of growth and age. The longest rhizome noted in the present collection of the fern was 51 inches, with numerous branches from 12 to 18 inches in length. The width also varies from $^1/_8$ to $^1/_2$ inch. The rhizomes are often covered with scales, which are oblong to ovate in shape. The rootstock is yellow, the underside being smooth, while on the upper side are numerous radicles.

The fronds of the fern are 6 to 18 inches long and $1^1/_2$ to 4 inches wide. They are oblong to linear in shape, very acuminate, and membraneous in texture. The leaf segments are numerous and alternate; they taper from a wide base to an acute or acuminate tip and are serrate. The stipes are usually much shorter than the blades; they are naked and straw-colored. The veins are free, with two to four veinlets, and are somewhat translucent. The sori have a roundish oval shape and are in two rows, one on each side of the midrib. They vary in number from eight to twenty-four according to size and shape of the leaf segments.

* Scientific Section, A. PH. A., Rapid City meeting, 1929.

Polypodium hesperium Maxon (16) is very similar to *Polypodium occidentale* but the fronds are not as large. It is found from Yukon to California, in South Dakota, New Mexico and Arizona, commonly on dry, rocky hillsides (9). The rootstocks are sweet and have a licorice taste.

Polypodium vulgare is the European variety, found throughout North America, Europe and Asia. The rootstocks are covered with cinnamon-colored scales. The fronds are four to ten inches high and are simple and deeply pinnatified. It is used as a remedy for catarrh and asthma (8) and is said to be an expectorant and diuretic. An infusion of *Polypodium vulgare* is said to be a cure for dyspepsia (14). Guignet (4) reports the presence of glycyrrhizin in this plant and states that it grows near Paris, Brest and in Vosges. It is said (4) to be present in rhizomes of *Polypodium semi-pennatifidum*, **var.** *indursum*, a native of the temperate region of Andes. Both plants are stated to be used as a substitute for licorice. *Polypodium Scouleri*, Hook and Grov. (9), also called leather-leaf polypod has a broadly ovate, leathery blade, 3–12 inches long, and rounded teeth. It grows near sea water from British Columbia to California.

CULTIVATION.

The collection of licorice fern in its natural habitat involves such great difficulties that for any economical production one must consider other methods of cultivating and harvesting. Attempts were made to find conditions suitable to its growth other than the natural one on logs and moss-covered trees.

The entire rhizome and fronds were planted in various types of soil and with varying amounts of light excluded, others were planted in heavy beds of moss with considerable moisture and shade, and still others placed in soil but the rhizomes covered with a heavy layer of moss.

From the results of the experiments, the fern seemed to grow best when the rhizomes were covered with moss and in the absence of any beneath them. This is probably due to the necessity for direct contact of the rhizomes with the soil. (Under further investigation.)

COLLECTION AND EXAMINATION.

Collections of the rhizomes were made at varying periods during 1927 and 1928, freed from adhering materials, washed and placed in a dryer at 75° C. for ten to fourteen days, then ground and placed in closed containers.

The samples were thoroughly cleaned and dried to constant weight at room temperature, then placed in an oven at 110° C. and again reduced to constancy. These and the ash determinations were made according to the methods of analysis of the Assoc. of Off. Agr. Chem.

VOLATILE MATTER AND ASH.

	No. 1.	No. 2.
Loss in air	75.44%	75.81%
Loss at 110° C.	3.48	3.60
Total volatile	78.92	79.41
Total ash	2.68	2.69
Acid-insoluble ash	0.26	0.28
Acid-soluble ash	2.42	2.41
Water-insoluble ash	2.06	2.09
Water-soluble ash	0.62	0.60

EXTRACTIONS.

The following tables give the percentage of extract soluble in organic solvents. In the first analysis the rhizome was used as such, in the second it was previously macerated with 10 per cent ammonium hydroxide for 12 hours and then dried at 85° C. All analyses were made by Soxhlet extractions, each sample being extracted for 18 hours, the percolate evaporated at room temperature and dried to constant weight in a desiccator. The volatile extract was determined by reducing the extract to constant weight at 110° C.

	Extracts from Pure Drug.			Extracts from Ammoniacal Drug.		
	Total.	Non-volatile.	Volatile.	Total.	Non-volatile.	Volatile.
		Alcohol.			Alcohol.	
1	37.49%	33.40%	4.09%	35.84%	32.12%	3.72%
2	41.05	38.23	2.82	35.56	32.12	3.44
3	31.44	28.21	3.23	...	...	..
4	33.25	31.11	2.14	...	...	..
Average	35.81	32.73	3.07	35.70	32.12	3.58
		Ethyl Acetate.			Ethyl Acetate.	
1	15.61	14.18	1.43	12.87	10.75	2.12
2	15.58	13.99	1.59	13.06	10.81	2.25
Average	15.59	14.08	1.51	12.96	10.78	2.18
		Chloroform.			Chloroform.	
1	7.73	7.68	0.05	9.01	8.60	0.41
2	7.69	7.61	0.08	8.91	8.47	0.44
Average	7.71	7.64	0.06	8.96	8.53	0.42
		Ether.			Ether.	
1	7.57	7.38	0.19	7.23	6.95	0.28
2	7.08	6.90	0.18	7.20	6.81	0.39
Average	7.32	7.14	0.18	7.21	6.88	0.33
		Toluene.			Toluene.	
1	6.82	6.81	0.01	8.29	7.93	0.36
2	7.11	6.91	0.20	8.45	7.73	0.72
Average	6.96	6.86	0.10	8.37	7.83	0.54

Aqueous Extract.—The aqueous extract was determined by a method given in the New Dutch Pharmacopœia (21) for extract value of licorice root. The method was as follows: The gross weight of a flask containing 2 Gm. of the drug and 100 cc. of water was noted. It was then heated under a reflux condenser for fifteen minutes, cooled, adjusted to the original weight and filtered. Fifty grams of the filtrate was evaporated in a tared dish and the residue dried to constancy in a desiccator.

The results as obtained from the licorice fern were 41.34 and 41.04 per cent; an average of 41.19 per cent.

Selective Extraction.—The dried powdered sample was successively extracted with various solvents in a Soxhlet apparatus, the extracts being dried to constant weight at room temperature and then at 110° C.

	Total.	Non-volatile.	Volatile.
		Petroleum Ether.	
1	5.92	5.89	0.03
2	6.22	6.19	0.03
Average	6.07	6.04	0.03
		Ether.	
1	2.58	1.86	0.72
2	2.61	2.50	0.11
Average	2.59	2.18	0.41
		Chloroform.	
1	1.03	0.63	0.40
2	1.14	0.97	0.17
Average	1.08	0.80	0.28
		Ethyl Acetate.	
1	2.49	2.24	0.25
2	2.06	1.85	0.21
Average	2.27	2.04	0.23
		Alcohol.	
1	20.03	15.95	4.08
2	22.70	17.19	5.51
Average	21.36	16.57	4.79

Sugars.—The rhizome has a very sweet taste, which is masked somewhat by a distinct and prolonged bitterness. Qualitative tests based on the formation of characteristic osazones, and the reduction (15) of heavy metals in alkaline solution showed the presence of glucose or levulose or both. Quantitative determination gave a yield of 13.45 and 13.72 per cent reducing sugars. The presence of sucrose was demonstrated by isolation and determination (7) of melting point and by formation of the glucosazone upon hydrolysis.

Starch.—A two-gram sample (15) of ground drug was freed from sugars by washing with cold water. The sugar free drug was boiled five minutes to gelatinize the starch. After cooling, 3 cc. of a saturated solution of Taka-diastase was added. A control test was made using 3 cc. of Taka-diastase. Both solutions were digested at 50° for twenty-four hours, filtered, treated with HCl and refluxed for $2^1/_2$ hours. The solutions were cooled, neutralized, clarified with lead acetate and made up to a definite volume. From the weight of dextrose found the original amount of starch was calculated and gave 1.30 and 1.22 per cent.

Pentosans.—The dried ground sample (13) (2 Gm.) was hydrolyzed with 8 cc. of concentrated HCl and 150.0 cc. of water. After neutralizing, 2 cc. of a uniform suspension of yeast were added. The sample was allowed to stand 12 hours at 37°, filtered and the residue washed thoroughly with water. The filtrate was boiled to remove any alcohol formed, and transferred to a 500-cc. volumetric flask. Lead acetate was added and made to volume and the whole filtered. The excess of lead was removed from an aliquot part and amount of sugars determined by the Munson and Walker method. From the amount of dextrose determined the pentosans

calculated were 6.39 and 6.05 per cent. Blanks using exact amounts of yeast suspensions were made.

Tannin.—Since the aqueous extract from the licorice fern had a somewhat astringent taste and an acid reaction, qualitative tests were made for tannic acid. Various test reagents gave positive indications of considerable amounts. The determination of total tannin was made by Lowenthal's gelatin method and gave an average of 3.45 and 3.89 per cent. This was found to be chiefly of the catechol variety.

Alkaloids.—Fifty grams of the drug were macerated for 48 hours with 150 cc. of alcohol, with occasional shakings. The drug was filtered off and the filtrate evaporated. The residue was macerated for 24 hours in 25 cc. of 1 per cent tartaric acid solution and filtered. The filtrate was then tested with Mayer's reagent, tannic acid, picric acid and Lugol's solution, one cc. of the filtrate being used for each. At the end of 24 hours no precipitate or turbidity was noticed in any case. It would appear, therefore, that the licorice fern does not contain appreciable amounts of alkaloids.

Volatile Oil.—Upon steam distillation of the licorice fern, 0.005 per cent of volatile oil was obtained. The oil was a reddish brown, viscid liquid, with a characteristic, disagreeable, pungent odor. The taste is first burning and a numbness of the tongue is noted, accompanied by a characteristically bitter and bland taste, which is very persistent and lasting.

Isolation of Color.—The yellow coloring matter occurring in the rhizomes was obtained by a method used by Houseman (10) in extracting a dye from licorice. One hundred grams of dried, ground licorice fern was exhausted with hot water and evaporated to dryness. The resulting extract was exhausted with 200 cc. of absolute alcohol and the solvent evaporated. The dye was then extracted with hot water.

Cotton, wool and silk were boiled with an aqueous solution of the dye, dried and then thoroughly washed in water. The coloring substance had no effect upon cotton or wool, but dyed silk a fast, pale yellow.

Glycyrrhizin.—Five grams of an extract of the drug was warmed with water according to a method by Linz (11). On cooling it was treated with 100 cc. of alcohol, allowed to stand, but no sediment was formed. The solution was filtered and concentrated to 30 cc. and made up to 50 cc. Then 5 cc. of sulphuric acid was added and allowed to stand, first one hour at room temperature and then twenty-four hours on ice. The precipitated glycyrrhizic acid-like compound was washed with 15 cc. of 2 per cent sulphuric acid at 0°. The precipitate was dried over sulphuric acid and extracted with successive volumes of hot 95 per cent alcohol and filtered into a tared dish, evaporated and weighed.

The mother liquid above, together with the washings, was saturated with ammonia and evaporated to a thick syrup. The residue was washed into a cylinder and made up to 18 cc. with water and 2 cc. of H_2SO_4 added and allowed to stand twenty-four hours. The precipitate was transferred to a filter, washed with 5 cc. of 2 per cent H_2SO_4 and 10 cc. of ether-saturated water. The precipitate was dried over H_2SO_4, extracted with 95 per cent alcohol, filtered and evaporated. The weight of this residue with that obtained above gives the glycyrrhizin content in 5 Gm. of the extract. A yield of 2.36 per cent was obtained, based upon the dried, powdered drug.

No crystallizable calcium or barium salts of glycyrrhizic acid could be obtained.

Ammoniated Glycyrrhizin.—Five hundred grams of powdered licorice fern was macerated with a mixture of 475 cc. of water and 25 cc. of ammonia water for twenty-four hours, then packed in a percolator and extracted with water until 500 cc. of the percolate was obtained. Sulphuric acid was added as long as a precipitate formed. The precipitate was collected on a strainer, washed with water until the washings no longer had an acid reaction and the residue dissolved in water with the aid of ammonium hydroxide. The solution was filtered, again precipitated with sulphuric acid, and the precipitate was collected and redissolved in ammonium hydroxide previously diluted with an equal volume of water. The clear solution was spread on plates of glass to dry.

The finished product was in black, shiny scales, inodorous and lacked the characteristic sweet taste. The solubility of the scales was the same as ammoniated glycyrrhizin prepared from the official licorice root. Both were insoluble in strong alcohol and ether, but were soluble in water, more so if warm, and in water containing a few drops of ammonium hydroxide.

The black shining scales and ammoniated glycyrrhizin prepared from glycyrrhiza were compared by tests given by Gawalowski (5). A cold, saturated solution of ammonium molybdate gave no change in either. No changes were noted when sesame oil and a solution of alpha-naphthol were added separately to the substances under analysis, but both showed a reduction with Fehling's solution by a quantitative analysis. Reactions given by Plenderleith (12) were carried out and gave the same results. Strychnine sulphate (Plenderleith used the hydrochloride) and quinine hydrochloride each gave a precipitate with solutions of the black crystals and of the ammoniated glycyrrhizin. Tinctures of opium and digitalis each gave a slight cloudiness with both substances.

From tests the crystals are identical with ammoniated glycyrrhizin in the reactions and solubilities, but vary in taste and color.

COMPARATIVE GALENICALS.

In order to compare the taste and color of the substance under analysis and as a possible substitute for the official licorice, preparations were made using the United States Pharmacopœia and the National Formulary procedure for glycyrrhiza products, and the characteristics of each noted. The drug under analysis was previously cleaned, dried and ground to the stated degree of fineness, while the official licorice was of the Pharmacopœia standard.

Fluidextract.—The percolate of the official drug was darker and, on prolonged percolation, the liquid contained a green coloration, while the percolate from the licorice fern was yellow. The finished product of both drugs on standing developed a small amount of brown sediment. The color of both fluidextracts was reddish brown, but the fern was a shade lighter. The taste of the two was remarkably different, the official had a sweet, pleasant aromatic taste, while the fern was unpleasant, decidedly bitter and lasting. The "licorice" taste was noted in both, but was much more pronounced in the official drug.

Extract.—The difference in appearance of the finished product was readily noticeable.* The official preparation was of a brownish black color while that from

the fern was reddish brown. Both extracts were sweet and contained the characteristic licorice taste, stronger, however, in the extract of glycyrrhiza. A bitter taste develops in both products, but in the official preparation it was only slight, while in the fern extract it was more noticeable and prevailed a greater length of time.

Compound Mixture.—The finished products on standing contained a brown sediment, which was easily mixed. Both preparations were reddish brown in color. The official compound mixture was sweet and possessed a lasting aromatic taste. In comparison, the finished fern product was also sweet but it was masked by a lasting bitter taste.

Compound Powder.—The finished products were very similar in appearance, both were grayish brown in color, while the licorice root preparation contained a yellow tint which made it an outstanding feature. Compound licorice powder was sweet and aromatic, while the sugary taste in the fern product was veiled with a slight characteristic bitter taste. The licorice taste was noticeable in both products.

Elixir.—Both preparations had the characteristic reddish brown color, with the elixir of licorice perceptibly darker. The taste was very similar, except that the official elixir was somewhat sweeter. In the fern product the bitter taste was absent.

Aqueous Elixir.—The finished preparations were both clear and reddish brown in color, but the official one was somewhat darker. Both were sweet and aromatic in taste, with the dulcet taste prevailing in the official preparation. The fern product obtained showed the absence of its peculiar bitter taste.

Fluidglycerate.—The characteristic reddish brown color was present with a darker shade in the official licorice product. Both were sweet in taste, the official product being more palatable and sweeter, while the noted bitter taste was absent in the fern preparation.

Syrup.—Both were clear, reddish brown preparations, that of the fern being a shade lighter. The products had a sweet, pleasing and licorice taste, the latter being more predominant in the official preparation.

Acid and Alkaline Preparations.—A fluidextract was made of the licorice fern using the United States Pharmacopœia IX Method containing ammonia water. Another preparation was made of the same drug using 2 cc. of concentrated hydrochloric acid and boiling water as a menstruum with which to macerate the drug, and then exhausting with boiling water. The percolate was concentrated to $^3/_4$ of the desired amount and alcohol added to the required volume.

Both preparations were reddish brown in color, the ammonia product being darker and more viscid. The licorice taste was present in both but not as prominent in the acid preparation. The acid product possessed a strong, puckering taste. According to Berg (18), ammonia water added to the menstrum in percolating licorice produces a gelatinous and otherwise undesirable product. He used varying amounts of ammonia water on the drug without any indication of increased sweetness. It was also noted that the amount of precipitate in the preparation on standing increased with the amount of alkali added.

Starch-Splitting Enzymes.—Fifty grams of powdered root and a like quantity of leaves were ground separately with 50 Gm. of purified sand and macerated for 48 hours with 250 cc. of distilled water. The percolate was filtered, put into measured quantities of starch solution and incubated (19). Control analyses were conducted

using the enzyme and starch each as blanks. The amount of cuprous oxide corresponding to the hydrolyzed starch is as follows:

	Blank No. 1.	Blank No. 2.	Total blank.	Blanks and enzyme.	Difference due to enzyme.
	7 cc. starch	3 cc. enzyme sol.		7 cc. starch	
	3 cc. water	7 cc. water		3 cc. enzyme sol.	
Root enzyme	0.0055	0.0080	0.0135	0.0884	0.0749
Leaf enzyme	0.0090	0.0029	0.0119	0.0201	0.0082

On the determination of diastase, the controls made with the starch and enzyme would take care of any intervening substances. Therefore, the difference in reduction between the controls and between the action of the plant juices on the starch must be due to enzymes.

Toxicity.—In order to compare the relative toxicity of licorice fern and glycyrrhiza, tests were made upon white rats. For this purpose a fluidextract of each plant was prepared and one cc. of this solution administered orally to separate animals. A third rat was retained as control. Since the average adult dose given by the Pharmacopœia is 2 cc. the amount used in this case was more than 300 times a usual dose. In the case of neither extract, however, was there any appreciable evidence of effect, except that none of the animals appeared as active as before. It would seem safe to conclude that extracts of the licorice fern are not harmful in large amounts.

SUMMARY.

1. The rhizome of the licorice fern, *Polypodium occidentale*, which grows prolifically in the Northwest, may be a substitute for licorice, *Glycyrrhiza glabra*.

2. It develops favorably and may be cultivated by growing in sphagnum moss covered with soil.

3. A proximate analysis of the plant was made including moisture, ash and selective extractions.

4. There were identified in the rhizome: reducing sugars, sucrose, starch, pentosans and tannic acid, presumably of the catechol variety. There were also present some volatile oil, a yellowing coloring matter and a starch-splitting enzyme. The plant is apparently free from alkaloids.

5. A product similar in properties to ammoniated glycyrrhizin was found in the rhizomes, the yield being 2.36 per cent based on the dried material.

6. Experiments in which the rhizome was fed to white rats indicated that it is non-toxic even in large amounts.

7. A comparison of galenical preparations made from licorice and from the licorice fern shows that, although those from the latter are somewhat less sweet and have a slightly bitter taste, these disadvantages might possibly be remedied.

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THE LEAF OILS OF WASHINGTON CONIFERS: II. JUNIPERUS SCOPULORUM.*

BY ARNOLD J. LEHMAN AND E. V. LYNN.

In a previous paper, a review was made of work which has been done on conifers of Washington. The present paper deals with the Rocky Mountain juniper. It does not occur to a great extent, being limited to certain regions, but it happened to be easily available to the writers and forms the basis of this investigation.

This species of juniper is a tree, ten to forty feet in height, with a short stout trunk, two feet or more in diameter, and often divided near the ground into a number of slightly spreading stems. The stout, spreading branches, which are covered with a scale-like bark, give the tree a rounded appearance. The bark of the trunk is reddish brown in color. The slender branches are covered with a thin, scaly bark. The leaves are opposite in pairs, acute, glandular and dark green. The fruit is about one-sixteenth of an inch in length and blue or rose color, ripening at the end of the second season, when it is from one-fourth to one-third of an inch in diameter, bright blue, covered with a glaucous bloom and usually two-seeded. The ripe seed is ovate, acute, light chestnut-brown, lustrous and about three-sixteenths of an inch in length.

Juniperus scopulorum, found ordinarily in arid regions, is common enough east of the Cascades and in the Rocky Mountains, whence its name, Rocky Mountain juniper. Strangely enough it has crossed its natural barrier, the Cascades, to reappear west of these mountains in only a few isolated localities in the northern Puget Sound region where there is an abundance of soil moisture. The material for this work was obtained from trees growing in bottom land having a sandy and clayey composition. This section receives an annual rainfall of about forty inches and, from the general character of the land, the indications are that this area is covered with water during certain times of the year, especially after heavy rains.

EXPERIMENTAL.

The material was gathered in the spring from a grove of trees near Everett, Washington. The leaves were separated as far as possible from the twigs and im-

* Scientific Section, A. PH. A., Baltimore meeting, 1930.

mediately distilled with steam. The oil was separated roughly from the aqueous distillate, which was once cohobated. The cohobated liquid was extracted with ether which was then separated and added to the first portion of oil. The ether solution was carefully dried and the solvent was largely removed by distillation, the last portions being separated by means of a vacuum. The total oil thus obtained from 336 pounds of material amounted to 750 cc., a yield of 0.49 per cent.

When freshly distilled, the oil was yellowish green and possessed a pleasing, balsamic odor, somewhat resembling that from blueberries. There appeared to be little tendency to resinification or hydrolysis, and the color showed little change after several months. The general constants were as follows: $d_{25°}$ 0.0966; $[\alpha]_D^{25°}$ +41.18°; $n_{D20°}$ 1.4856; acid number 1.52; saponification value 11.29. Calculating the ester as the acetate of borneol, the amount is 3.41 per cent, the quantity of alcohol from this by hydrolysis 2.68 per cent.

The oil was first shaken with a 5 per cent solution of sodium carbonate to remove the free acids and then with 5 per cent sodium hydroxide to separate the phenols. The aqueous liquids were then shaken with ether to remove any adhering oil, and the ether solution was added to the residual oil. The ethereal solution was washed with water until the washings were neutral, the latter being added to the sodium hydroxide solution, which was then made acid and completely extracted with ether. After drying with calcium chloride, the ether was evaporated, leaving a small amount of a dark brown oil having a pleasant, creosote-like odor. It did not solidify even after cooling to —15° C. for some time. The amount obtained was too small to permit more than an ultimate analysis.

0.0720 gave 0.1777 CO_2 and 0.0705 H_2O. Found: C, 67.3; H, 10.8. Calculated for $C_1H_{16}O_2$: C, 67.1; H, 10.5.

After drying and removing the ether, the remainder of the oil was fractionated under reduced pressure. That portion which boiled below 100° C. at 10 mm. was purified by repeatedly distilling up to the same temperature, the residue in each case being added to the main body of oil. It was then subjected to fractionation under ordinary pressure and then to several refractionations. Eventually the following portions were collected: 155–160°, 4.2; 160–163°, 18.6; 163–169°, 14.5; 169–174°, 4.3; 174–185°, 3.0 per cent of the total oil.

Alpha Pinene.—The first fraction was a yellow liquid which distilled chiefly at 157° C. An ultimate analysis indicated that it was mixed with a small amount of oxygenated compounds. Attempts to prepare a nitrosochloride were unsuccessful, as might have been expected due to the high optical rotation (6). The presence of α-pinene was readily shown, however, by oxidation to pinonic acid by means of potassium permanganate (4). After completion of the reaction the mixture was distilled with steam to remove excess oil and the residue was filtered, acidified, and completely extracted with chloroform which gave a dark brown, syrupy oil which did not crystallize. A semicarbazone prepared from it was found to melt at 203° C. which identified the oil as pinonic acid.

Camphene.—The second fraction was a colorless liquid which distilled mainly at 160.5–162° C.

0.1235 gave 0.3875 CO_2 and 0.1351 H_2O. Found: C, 87.8; H, 12.1. Calcd. for $C_{11}H_{16}$: C, 88.2; H, 11.8.

It was hydrated according to Bertram and Walbaum (3) with acetic and sulphuric acids giving a light yellow oil with a camphoraceous odor. At —10° C. a substance crystallized out, but it was found impossible to separate in this way. That hydration had taken place was indicated by reduction in percentage of carbon.

0.1391 gave 0.4209 CO_2 and 0.1405 H_2O. Found: C, 81.8; H, 11.2. Calcd. for $C_{11}H_{11}O$: C, 77.9; H, 11.7.

In order to confirm the presence of isoborneol in this hydrated oil an attempt was made to make its phenyl urethane. The crystalline product, after careful purification, melted at 148° C. and could not be the isoborneol derivative which melts at 138° C. The amount was too small for further investigation. Another portion of the hydrated oil was oxidized with Fittig's chromic acid mixture (1) giving a few oily drops which had a strong odor of camphor.

While no definite evidence could be found of the presence of camphene in the fraction, the authors are convinced of its presence and hope to prove the point later when larger amounts of material are available.

Beta Pinene.—The comparatively large third fraction distilled mainly between 166° and 168° C.

0.1420 gave 0.4576 CO_2 and 0.1537 H_2O. Found: C, 87.9; H, 11.3. Calcd. for $C_{10}H_{16}$: C, 88.2; H, 11.8.

The presence of beta pinene was demonstrated by oxidation to nopinic acid with alkaline potassium permanganate (5). The resulting sodium salt was dissolved, and the solution was acidified and extracted with ether, producing a yellow oil which gradually crystallized. From this was separated flat plates which were apparently nopinene glycol $C_{10}H_{18}O$ and a larger amount of needles. After repeated recrystallization from ether the latter were found to melt at 123–124° C.

0.1245 gave 0.2848 CO_2 and 0.1011 H_2O; 0.1038 gave 0.2391 CO_2 and 0.0820 H_2O. Found: C, 62.5 and 62.8; H, 8.8 and 8.6. Calcd. C, 65.2; H, 8.6.

Terpinene.—The fourth fraction which was very small distilled chiefly at 172–174° C. The presence of terpinene was readily demonstrated by conversion to the nitrite (2). The product was purified by recrystallization from boiling hydrochloric acid giving fine, white needles melting sharply at 155° C.

The fifth fraction was suspected to contain limonene or dipentene but attempts to prepare derivatives with bromine or with hydrogen chloride gave only uncrystallizable oils.

Saponification and Fractionation.—All of the oil boiling above the terpene fraction was hydrolyzed by heating with alcoholic potash on a water-bath for two hours. After distilling off the greater part of the alcohol, the residue was placed in a separatory funnel and enough water was added to effect separation of the oil, which was removed. The alkaline liquor was extracted several times with ether and the combined ether and oil was washed repeatedly with water. After drying the ethereal solution with calcium chloride, the solvent was removed and the residue was distilled under reduced pressure. Finally it was refractionated repeatedly under ordinary pressure, collecting as follows: below 190° 3.0; 190–203° 1.0; 203–216° 3.5; 216–222° 4.8; 222–240° 8.0; 240–250° 7.5; 250–260° 6.0 per cent of the total oil. The first two fractions were so small in amount that no identifications could be made. Treatment with bromine gave no crystalline product.

Analysis of the third (I) and fourth (II) fractions gave the following results:

I. 0.2389 gave 0.6915 and 0.2304 H_2O; 0.2245 gave 0.6523 and 0.2205 H_2O. Found: C, 78.9 and 79.1; H, 10.7 and 10.9.

II. 0.1674 gave 0.4429 CO_2 and 0.1638 H_2O; 0.1342 gave 0.3842 CO_2 and 0.1242 H_2O. Found: C, 78.1 and 78.8; H, 10.7 and 10.5.

Required for $C_{10}H_{18}O$: C, 77.9; H, 11.7.

Since they were relatively small, the two fractions were mixed, after reserving a portion of II. The mixture was gently oxidized with chromic acid solution, using 52 Gm. of potassium dichromate and 78 Gm. of sulphuric acid in 150 cc. of water. After all of the acid solution had been added, the mixture was heated on a steam-bath for twenty minutes and then distilled under diminished pressure. At no time during the oxidation process was an odor of camphor perceptible, so it may be concluded that borneol is not present.

Terpineol.—The acid liquor remaining from the above distillation was shaken out with ether, and the ethereal solution was washed several times with water and dried with calcium chloride. After distilling off the ether, there remained a light yellow oil with a strong acetic odor. Being not very soluble in sodium carbonate solution, it was redissolved in ether and shaken twice with a 5 per cent solution of this salt. After drying the residue and removing the ether, there was left a light yellow oil with a pleasant, coumarin-like odor. This is undoubtedly the ketolactone previously obtained from terpineol by oxidation, but it could not be obtained in a crystalline state, even after standing in a vacuum desiccator for some weeks.

The sodium carbonate solution, from which the above substance was separated, was acidified and shaken out with ether as before, giving a yellow oil which soon became a crystalline paste. After several recrystallizations from anhydrous ether, the melting point was found to be sharply at 175° C. This is evidently terebic acid, known to be formed as a direct oxidation product of terpineol with chromic acid.

The portion of II which had been reserved was shaken with a concentrated solution of hydrogen iodide, producing a heavy, dark brown oil. This was separated from the aqueous layer, shaken several times with sodium sulphite solution to remove free iodine, washed with water, and allowed to stand. A strong sassafras odor developed but the oil did not crystallize. Although no proof can be presented, terpineol is probably present in the oil.

The other three fractions up to 260° C. were comparatively large, constituting nearly one-fourth of the total oil, but no positive identifications could be made; the analyses indicated ketonic or alcoholic character, but attempts to make oximes or other derivatives failed. Each was soluble in 70 per cent alcohol with turbidity and each gave a color reaction with a mixture of acetic and sulphuric acids, similar to that by cadinene.

That portion of the oil boiling above 260° C. was fractionated at 60-mm. pressure and eventually there were obtained three fractions: 165–180° 8.5; 180–195° 4.5; 195–230° 3.0 per cent of the total oil. All of them were blue or green, especially the last which was a beautiful blue, and each was soluble in 70 per cent alcohol. They also gave with concentrated acetic and hydrochloric acids an intense reddish violet color. The blue substance was soluble in syrupy phosphoric

acid with a dark red color and could be recovered by adding water. These reactions are characteristic (7) of azulene, which has been found in many oils.

The analyses of the last six fractions follow:

Boiling point	222–240	240–250	250–260	165–180	180–195	195–230
Color	Yellow	Green	Green	Green	Blue	Deep blue
Odor	Sassafras		Slight			
Wt. sample	0.1346	0.1254	0.1405	0.1809	0.1173	0.1558
CO_2	0.3836	0.3562	0.3955	0.5055	0.3287	0.4350
H_2O	0.1215	0.1151	0.1164	0.1517	0.1066	0.1388
Carbon, %	77.7	77.4	76.8	76.3	73.9	76.1
Hydrogen, %	10.0	10.3	9.2	9.2	10.0	9.5

The Acids.—Since the amount of ester in the original oil was very small, a correspondingly small quantity of saponified acids could be expected. The alkaline solution was evaporated to a low volume, acidified and distilled with steam. As soon as the distillate came over clear, the residue was cooled, again made alkaline and extracted with ether. Evaporation of the solvent gave no residue, showing the absence of lactones. From the aqueous residue, after acidifying, there was only obtained a minute amount of dark brown oil with an unpleasant odor, which indicated that most of the acids were volatile.

The distillate, which had an odor of butyric or valeric acid, was made alkaline and evaporated to a small volume. A portion heated with alcohol and sulphuric acid developed an odor of ethyl butyrate. The remainder was made neutral and precipitated with silver nitrate, resulting in a white salt which contained 57.6 per cent of silver. The acids were evidently butyric (55.4 per cent) and, to a small extent, acetic (64.6 per cent).

SUMMARY.

The leaves of *Juniperus scopulorum* furnish 0.49 per cent of an oil, whose general properties are described. The terpenes, which constitute about 42 per cent, consist of α-pinene, β-pinene and terpinene, with probably some camphene. The oil contains no borneol, but probably about five per cent of terpineol, partly as butyrate or acetate. There are also present some phenol, a relatively large amount of unidentified oxygenated compounds, and a small quantity of azulene.

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"The people must realize that the ultimate control of many diseases, like cancer, influenza, blood poisoning, infantile paralysis, alcoholism, crime and mental disease, depends upon research by a specially trained group, in the laboratories of medical sciences, and this research must be financed by the people, through their representatives and state and federal legislatures. Neither the profession nor the public, to-day, has appreciated the demand, if they wish full protection against disease, for a greater budget to the existing research laboratories in this country."—JOSEPH COLT BLOODGOOD, M.D.

A STUDY IN PHARMACY.*,1,2

BY JOHN URI LLOYD, WOLFGANG OSTWALD AND WALTER HALLER.

Let us now consider some of the characteristics of the fourteen solvents classified on page 137, JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1918.

GLYCERIN.

This odorless alcohol possesses valuable characters as a solvent, but has been largely misused in pharmaceutical directions. For this error the Pharmacopœia of 1860 seems to a considerable extent responsible, because in that publication glycerin was given an undeserved conspicuity in connection with many galenical preparations in which its presence was undesirable, or at least unnecessary.

Glycerin serves a useful purpose for abstracting and holding tannates or near-tannates. It is a good solvent for a few alkaloids and neutral principles, but for the natural alkaloidal structures that exist in plants it is generally inferior to either water or alcohol. It is of no value in abstracting resins, fats, wax and oil, and should never be employed for this purpose. In many respects glycerin resembles water as a menstruum more nearly than it does either ethyl or methyl alcohol. One advantage it possesses over water is that, like alcohol, it does not expand ligneous fibre or other plant structures. For this reason it is sometimes desirable to substitute glycerin in moderate amount for water, where its solvent power as regards the desirable constituents of the drug may be no greater than that of water, or even inferior. Exceedingly gummy drugs, for example buchu, may be studied advantageously in connection with glycerin. By so doing it is possible to prevent the objectionable expansion of this as well as other glutinous drugs. Glycerin as a menstruum for plant extraction has, for some purposes, the disadvantage of not being volatile. For this reason, in making fluid plant products, care must be taken not to use more glycerin than the final standard will admit, as the excess cannot be evaporated. This is important in the direction of such substances as fluidextracts, where low grade percolates are to be evaporated. Nor can the difficulty be overcome in the preparation of solid extracts. Often glycerin is desirable in such preparations (solid extracts) as a final addition, in order to prevent subsequent drying.

Glycerin mixes with water in all proportions, and neither ferments, evaporates nor freezes at ordinary temperatures. Thus as a pharmaceutical solvent it presents characters possessed by no other feasible, neutral solvent. For this reason it is often desirable to substitute a portion of glycerin for water where alcohol is

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* Continued from the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 18 (1929), 214–224.

[1] Scientific Section, Portland meeting, 1928.

[2] This article, written between the years 1879 and 1885, is naturally defective in many directions as contrasted with the researches made since that date. Appreciating this fact the author ventured to place the manuscript in the hands of Dr. Wolfgang Ostwald of Leipzig, with the request that he comment thereon in directions where, in his opinion, his comments could be serviceable. These comments will be found as footnotes under the respective page locations. Unquestionably the readers of the article as well as myself must gratefully accept his thoughtful contributions.

inadmissible. In many instances it may thus be used to advantage even where glycerin possesses no solvent superiority. Pure glycerin is not always a "non-irritant" as seems to be generally accepted. It has a strong affinity for water and abstracts it with avidity from mucous and abraded surfaces, producing a sensation of warmth when applied to the skin. When concentrated glycerin is injected into the tissues, often great pain follows. Hence it should be diluted with water or some bland liquid when designed as a solvent for drug principles that are to be employed hypodermically or applied externally.

Glycerin is the most feasible of all neutral solvents for the red tannates and astringent plant constituents. In the writer's experience it should constitute a good part of the menstruum used in making (or in finishing) fluid preparations of such substances as oak bark, gossypium, sassafras bark, stillingia, geranium and similar vegetable bodies, which we hope to study hereafter separately.

WATER.

This agent is the most important of all solvents, being abundant, and used from time immemorial. And yet, in legitimate pharmacy, water has a circumscribed application, notwithstanding its great value as a cosmopolitan extractor and solvent. This is owing to the fact that an aqueous solution of plant constituents is prone to subsequent decomposition and fermentation. Water is an excellent solvent of mucilaginous, albuminous and saccharine substances. It also abstracts natural tannates, or plant astringents, more or less freely, many plant coloring matters; some alkaloids and most if not all natural alkaloidal salts; most glucosides (perhaps the term "many" is better) all the sour vegetable acids and many other substances that are obtained from plants and are classed as vegetable acids. Boiling water bursts the corpuscles and then dissolves starch and likewise disintegrates other vegetable tissues that are scarcely affected by cold water, thus forming liquids (by reason of the pressure of the dissolved materials) of different solvent power from cold water. In this way it is found that water solutions of plant constituents may produce important menstruums, quite different from water alone.

It may thus be made to dissolve water-insoluble substances that from their characters, at the first glance, would appear not to be soluble in a menstruum in which the only added liquid present is water.[1]

Under such circumstances water may become a solvent or at least an abstractor of resins, oils, glucosides and other plant constituents that, in a purified condition are insoluble or nearly so in water. This character (alteration in the solvent power of water by reason of substances dissolved) is advantageously employed in directions that may properly be mentioned as methods of comparison. These examples also show how its solvent power is affected by the presence of other substances, thus, although water alone is used, the solution really forms menstruums different from water. Familiar illustrations, from the inorganic field, may be cited as follows:[2]

Iodide of lead is soluble in about 2000 parts of water, and yet is freely soluble in aqueous solution of chloride of ammonium. In ordinary conditions it is a citron

[1] See "Precipitates in Fluidextracts," PROCEEDINGS A. PH. A., current issues (1879–1885).

[2] The problem of double salts, even physical chemistry, intrudes in this field.

yellow powder, but may be easily obtained in crystals from a hot solution of water and ammonium chloride. In the manufacture of potassium ferrocyanide (from leather and potash) considerable amounts of sulphate, sulpho-cyanides and the sulphides of potassium result as admixtures. In order to manufacture the substance economically, the sulphate, sulphocyanide and sulphides must be separated both from the excess of potash of the "liquor," as well as from the ferrocyanide of potassium. This is readily accomplished under a careful study of the value of water, both pure and saline, as illustrated by its foreign content. By the use of the proper proportions of alkali (potash) these substances can be successively expunged or even crystallized, although it is impractical to obtain definite crystals of the sulphides of potassium from pure aqueous solution. Examples such as these, or others more familiar perhaps, might be multiplied to illustrate the fact that, even in pure chemistry, water as a solvent is altered in value by the presence of indifferent substances.

The phenomenon is very much more important in galenical pharmacy where our plant tissues are made up of associations of complex bodies. Here it should be accepted that the solution of the indifferent substance in water produces new menstruums which act as new mediums, and that water is not then the sole menstruum that finally effects the solution of the class of substances referred to. It is only a part thereof.[1] It may be shown by experimentation that when water is employed as a menstruum with various proportions of some definite chemical substances that are indifferent to each other, the solvent power of the medium changes in accordance with its composition, either increasingly or decreasingly as proportions and materials vary. The value (influence) of water as a galenic solvent is thus largely governed by the substances it holds in solution, even though they are chemically indifferent to each other. These conditions are often so obscure as to promise to become an object of advanced detail study.

Having introduced the foregoing as an illustration of the principle involved, the relationship in pharmacy between such examples and the use of water as a menstruum naturally follows. The difference between the making of a menstruum by dissolving isolated substances in water and the consideration of water in its action on complex plant structures, where in the crude drug many substances are physically associated or united in adhesion complexities, is markedly important. We then find that water may become a solvent for modicums of such constituents as resins, oils and the indifferent bodies before alluded to.

It is impossible to infuse a crude vegetable drug in water without dissolving such constituents as gums, sugar, some coloring matters and mineral salts, that are in themselves water-soluble and are blanketed together by writers as "the usual constituents of plants." These produce, when dissolved in the water, especially when heat is employed, a new menstruum that bears quite different relationships to other bodies present in the plant, from that which pure water bears toward the same substances after their isolation. In some cases the solvent action increases, in others it diminishes in accordance with the substance (drug) operated upon, as well as by variations in the proportions of the dissolved ingredients.

It is not unusual to find during the act of maceration changes, such as have

[1] This rule applies to the other solvents, but having been considered here need not again be mentioned.

been described, that insensibly grade into each other and produce several distinct solvent reactions. In the first series of such manipulation processes, substances may dissolve that are afterward thrown out of solution by subsequent menstruums thus produced. Such precipitates may even, after a period, again dissolve. Thus at first the decoction of a drug is a solution of some of its constituents in water, finally to become, at a point of concentration, a solution of water in the extract. In such cases a transparent liquid extract made of water as the solvent precipitates on the addition of water. I have met instances where a thick mush immediately resulted.

Precipitates of plant structures that flow and ebb into solution and out again have been noticed by me, although as a rule a precipitate cast down by a change in solvent power of a solution remains a precipitate unless the temperature changes. It is a well-known fact that aqueous infusions and decoctions of drugs in which isolated "active" principles of these drugs are scarcely soluble may be therapeutically energetic. While it is true that in many instances these preparations depend upon mechanically suspended, finely-divided suspensions of proximate principles (emulsion-like), it is no less evident that when first made the constituents approach true solution. For such substances in the borderland between precipitates and solutions, I use the term *near-solutions*, considering them as a class to themselves. Cathartic solutions may thus be made by percolating resinous drugs, as jalap or podophyllum[1] with cold or hot water and filtering the percolate. This especially applies to green, undried drugs. Fixed oils and fatty and waxy bodies practically insoluble in water may be abstracted from water-filtered solutions of these drugs by chloroformic rotations, thus showing they have passed into solution.[2] After separation they refuse to re-dissolve in water. Under these conditions as already stated the plant constituents that are dissolved first in the water serve to form solvents of different powers than those possessed by water.

In further studying the nature of water as a solvent for galenicals in pharmacy, we are led to conditions that seem even more opposed to our understanding of the solvent power of a purely aqueous menstruum, but which are perfectly rational when considered in the foregoing relationship. By way of example, if an ounce of a given chemical be dissolved in enough water to produce a saturated solution, the evaporation of a part of the water of such solution reduces the capacity of the residue as a solvent and, when the remainder of the solution cools, precipitation or crystallization of the superfluous salt usually results rapidly (excluding so-called supersaturations).

The *opposite* is possible in many conditions where water is used as a solvent in plant pharmacy. Although the writer has never seen the statement made, all who have been concerned in the practical manipulation of pharmaceutical preparations may readily recall experiences where water has been used as a plant extractor,

[1] The writer is aware that resin of podophyllum is not a true resin, but is slightly soluble in water, not, however, to the extent it is under the conditions named.

[2] Let us reserve the coined term *near-solutions* in which molecular dispersion seems to form a borderland of much interest.

Ostwald: Francesco Seleni (the discoverer of the cadaver alkaloids, *i. e.*, ptomains) called those systems "pseudo-solutions" in about 1840–1850.

in which the filtered concentrated solution precipitated at once on the addition of water. This apparently paradoxical phenomenon may also be easily exhibited in another way. In many aqueous solutions that contain precipitates and are turbid therefrom, the undissolved matter gradually disappears *as the mixture is concentrated by evaporation;* finally at a given point forming a transparent solution which will become turbid when water is added thereto, but which re-precipitates when water is added in amount sufficient to reproduce the original bulk. Manufacturers of aqueous solid extracts are familiar with the fact that the turbid percolate of many drugs becomes clear when the evaporated percolate approaches the consistency of syrup, forming then, when in thin layer, a transparent ruby extract, which as a rule, although clearly a perfectly homogeneous mass, is only partially re-soluble in water.

This phenomenon results from the fact before stated that the water forms a part only of the menstruum in which, when the proportion of water is increased sufficiently to disturb the equilibrium of the compound, the result is the exclusion of one or more of the constituents. Sometimes successive precipitations of several substances follow in a manner that will be more fully considered in another place.

Temperature must not be overlooked in this connection, where ebullition is employed, for, when an infusion or decoction is being evaporated by boiling, the temperature increases as the water disappears, which increase of temperature induces the liquid gradually to increase in solvent power as well as to produce alteration of content. The increased solvent capacity induced by the successively rising temperature may even render the remaining liquid (notwithstanding loss by evaporation) a better solvent for certain substances than was the original at the lower temperature.[1]

A vital point in this connection is that continued application of heat, either high or low temperature, dissociates some of the constituents operated upon, forming others of different nature, as well as solvent power. Such decomposition products are as likely to be less as more soluble in water.

After a dry vegetable powder is moistened with water it expands considerably, and this is true to a modified degree of diluted alcohol. In working large amounts of powdered drugs, after moistening them with water it is best to permit them to expand before packing them for percolation. The writer has known large glass percolators to be burst into fragments by expanding drugs, and it is not unusual for such expansion to render powders so compact that percolation is suspended. With buchu, comfrey, sassafras and similar mucilaginous drugs, the act of percolation by aqueous liquids is also arrested because the powders not only expand, but become slimy, coalescing into a viscid mass, from the mucilage produced.

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[1] In my opinion the term "water as a solvent" becomes in these directions reversed to *water dissolved by the water-made solvent.* A time comes when the concentrate is dominated by the solids, then the water is dissolved by the mass, a transparent liquid resulting.

Ostwald: Good examples of a new solvent power by only mixing water and alcohol are seen with plant albumins, resp., globulins, for instance, zein, the globulin of corn flour (Zea Mays). This albumin is only soluble in mixtures of about 70–80% alcohol. It precipitates *as well* by pouring the water-alcohol solution into pure water or into absolute alcohol.[2]

[2] You obtain a solution of this globulin only by digesting corn flour with this mixture.

The solubility of nitrocellulose (collodium) is, of course, well known, only in mixtures of alcohol-ether, etc.

As a rule, substances are more soluble in hot than in cold water, but there are exceptions even with a few of the mineral salts, as for example, citrate and hypophosphite of calcium, in which a cold saturated solution becomes turbid on heating, to precipitate at a boiling temperature and re-clarify on cooling. It is not impossible for organic bodies to act in the same manner, but the writer knows of none so constituted.[1] In the case of sodium sulphate, that at successive temperatures precipitates by reason of molecular rearrangements in which successive degrees of dehydration at increasing temperatures are followed by the formation of less soluble salts, another cause of greater solubility at low temperatures is exemplified, but no similar example (hydration differences) presents itself to the writer in the consideration of plant products.

Aqueous solutions of dried plants when filtered are usually dark brown. They are often syrupy or even "ropy" by reason of the burden of the gum, mucilage, plant sugars mostly uncrystallizable and "extractive matters" that dissolve easily in water. The addition of alcohol causes precipitation of all or part of these bodies. By alcoholic additions such substances as inorganic salts may also be more or less excluded, and by adhesions thereto alkaloidal salts, or even very soluble substances, may follow as precipitates. By the proper manipulation of neutral menstruums, such as water and alcohol mixtures, dissociations of plant conglomerates can be accomplished without the destructive application of heroic chemistry.

ALCOHOL.

This menstruum mixes with water in all proportions and equals water in importance as a solvent, being in pharmacy indispensable and irreplaceable. It is particularly applicable to the abstraction of resins, fats, most neutral principles, natural alkaloidal salts, chlorophyll and chlorophyll wax or tallow,[2] most coloring matters, amorphous plant sugars, and nearly all the acrid and bitter constituents of plants. It refuses to dissolve gum, mucilages, starch, albuminates and many mineral compounds, but yet it extracts most mineral organics. It does not dissolve any considerable amount of crystallized cane sugar.[3]

Alcoholic solutions neither ferment nor putrefy, in consequence of which alcohol more or less diluted has long been employed as a solvent in the making of tinctures, which are the offspring of mediæval elixirs, or at least contemporaneous with them. These were followed by fluidextracts or "concentrated tinctures," as well as solid extracts.

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[1] Since the above was written the solution of an alkaloid from Veratrum has, in the writer's hands, proved to precipitate on warming, to re-dissolve on cooling.—J. U. L.

Ostwald: Water + diethylamine
Water + β-collidine
Water + nicotine (C. S. Hudson, *Z. physik. Chem.*, 47 (1904), 113)

are organic substances which have a *decrease* in solubility at certain higher temperatures.

[2] Chlorophyll in vegetation is so closely connected with plant wax, grease and fat as to be nearly inseparable therefrom. They go together into solution and out again. I have coined the term "chlorophyll wax or tallow" for such adhering educts.

[3] In vegetation, sugars in an uncrystallized condition are soluble in alcohol. After crystallization they may become practically insoluble.

Alcohol is an important *excluder*, as well as solvent, and this property gives it a special value, in many instances scarcely less prominent in pharmacy than are its dissolving and anti-fermentative qualities. By this term, excluder, which is herein perhaps first used in pharmacy in the sense employed, should be understood its power of throwing out of solution such bodies as gums, albumen, mucilage, most cane sugar and the mineral salts which, intimately associated with medicinal constituents, are usually present in roots in considerable amounts.

For example, although water is a solvent for the desirable constituents of squill, it is scarcely practical to make a concentrated liquid representative of that drug by using water as the menstruum, because of the abundance of mucilage abstracted by it. Although acidulated water, on account of the preservative action of acetic acid (as well as solvent service), is probably the rational solvent for the therapeutic constituents of that drug, its use is precluded other than in making of comparatively dilute solutions as for example, vinegar of squill or syrup of squill. Perhaps one of the most familiar examples in illustration of the excluding value of alcohol is exhibited with nux vomica, in which, although acidulated water is unequaled as a solvent of the textural alkaloids, we are forced in manipulative pharmacy to employ nearly strong (U. S. P.) alcohol in order to avoid the loads of mucilage that are also abstracted by water.[1] Accordingly, if the water be increased beyond a certain proportion, the liquid becomes syrupy, opalescent and refuses to filter, the drug swells to an enormous degree, and neither percolation nor maceration is practical in pharmaceutical directions. By taking advantage of the quality of alcohol as a solvent of textural alkaloids, and conversely as an excluder of this class of gummy and mucilaginous substances, the alkaloidal content can be fairly abstracted. Alcohol is not, as is generally accepted, superior to water as a solvent of the majority of natural active principles, but actually inferior thereto, were the undesirable neighbors not disturbers.

This is true of many similar preparations that pharmacists find necessary to prepare, but it must be remembered that sometimes the mucilaginous principles of a drug are those desired. Among such substances may be named, comfrey, elm bark, quince seed, althea, chestnut and similar vegetable productions, in which the less alcohol employed the better. But as a preservative, we are forced even with these to use some alcohol, either as a part of the menstruum or as a later addition. In our experience eighteen per cent alcohol is needed.

Thus it will be seen that when we study alcohol as a menstruum we have to consider its excluding power from two aspects. It may improve one class of preparations by excluding inert substances and it may injure another class by excluding those desirable.[2]

One of the advantages alcohol enjoys over water in the abstraction of spongy vegetable tissues is the fact that woody materials, alike insoluble in both menstruums, are penetrated (swollen) by water and not by alcohol. Such substances absorb water freely, expand, often enormously, and cannot be abstracted by percolation if water is employed as a menstruum, even though the active principles

[1] Various aqueous menstruums can be employed in the preparation of alkaloids.

[2] These remarks regarding excluders are not limited to alcohol. Any antipode of this solvent throws out of alcoholic solution materials held therein. Thus *water* becomes an excluder where resins and fats are dissolved in alcohol.

of the drug are perfectly soluble in water. Of this class, arnica, chionanthus and collinsonia may be mentioned as illustrations. Other substances deficient in ligneous material absorb water, soften, agglutinate and at the same time often expand in bulk, then become slimy or pasty, thus preventing satisfactory percolation or abstraction by maceration. Of this class buchu, senna, sassafras and squill are familiar types. In such instances the use of water alone as a percolating menstruum is out of the question and, although alcohol is inferior as a solvent for the desired constituents of the majority of such bodies, we are compelled to give preference to mixtures of alcohol and water in order to overcome these obstacles. The foregoing points embrace the important features concerning alcohol as a pharmaceutical menstruum in contra-distinction to water, with which, from its importance in pharmacy, it naturally should be classified.

Alcoholic percolates or filtrates of dry plant remedies are often brown or brown-red (tinctured) from the presence of resinous or tannin-like plant constituents, as well as their load of flavone derivatives and glucosides. They are usually mobile and easily filtered. As a rule they precipitate or lose their transparency on the addition of water, by reason of precipitation of these and allied substances.

METHYL ALCOHOL (WOOD ALCOHOL).

This liquid can be used as a vegetable solvent in some instances instead of ethyl or ordinary alcohol, providing it is not retained as a part of the finished preparation.[1] It has a solvent action on resins, oils, fats and many plant constituents such as chlorophyll, alkaloids, alkaloidal salts and neutral principles. It will not dissolve gum, starch, inorganic salts, albumen and mucilage. It is very volatile and much loss is experienced in handling it in ordinary manipulative processes, so much so that the difference in price in its favor as compared with ethyl alcohol is often more than balanced by the increased loss. Another factor that operates against commercial methyl or wood spirit is the irritating action of its vapor in the eyes of the workmen, a factor that must be considered in manipulating on a large scale. Besides this, its complexity of by-products make commercial "wood alcohol" a forbidding conundrum so far as internal medicine is concerned.

ACETONE.

This cosmopolitan solvent presents perplexing qualities when employed as a solvent in plant pharmacy. Whereas it is an immediate solvent for a great list of plant structures and products, it seems at once to begin both to dissociate as

[1] Most tenaciously do some vegetable structures hold very volatile liquids. For example, benzol (and commercial benzine) long adhere to ligneous bodies if they be in a finely divided condition. Seemingly, a form of attraction similar to *catalytic* is involved. A parallel seems to be in solution precipitates whereby a precipitate thrown out in colloidal (see Graham's work) form, carries with it other materials very soluble in the liquid of which it is a part. This interesting phenomenon is very important. It should be studied scientifically and it should not be accepted that a material is not affected by adhering materials theoretically inactive.

Ostwald: To-day we call this binding capacity of finely divided substances "adsorption capacity." It is used in recovering, for instance, the vapors of benzol, etc., in the manufacture of rubber goods.

acetone and also to dissociate the material dissolved. In this way new products continuously arise, often very soon, of varied undefined compositions. To such a degree is this true as, even within a short period, practically to decompose textural alkaloids and alkaloidal salts even of most pronounced characteristics.

The rhizome of Sanguinaria may be mentioned as an example, the changes being easily manifest to the sight. If slices of the fresh rhizome, dripping with blood-red juice, be submerged in acetone, the change to yellow is immediate. In twelve hours the color disappears, excepting some of the pockets of red, resinous saturated cells in the drug's structure. In forty-eight hours the section becomes grey, practically no red cells remaining. The original alkaloidal structure has completely disappeared. The writer of this paper touches acetone very lightly in manipulative plant processes.[1]

CHLOROFORM.

This liquid stands unique in the fact that of all the volatile solvents of fat and oils herein considered, it is not inflammable, nor is its vapor combustible. When mixed with air its vapor is not explosive. Thus it stands alone, and separated from sulphuric and acetic ether, benzol, benzin, carbon disulphide, methyl and ethyl alcohols, acetone and essential oils. Its nearest friend in this regard is amylic alcohol, with which it may be classed in some respects as a solvent. For this reason, whenever it is necessary to employ a volatile fat abstractor near a flame, the writer naturally selects chloroform, if it has no immediate destructive influence on the material manipulated.

Chloroform mixes in all proportions with members of the second, third, fourth, fifth and sixth classes. (See "Solvents in Pharmacy," Jour. A. Ph. A., 6 (1917), 940–949.) It dissolves in about two hundred volumes of water, but does not take up an appreciable amount of that liquid when shaken with it. Chloroform dissolves chlorophyll, wax, oils and fats, many resins as well as caoutchouc-like bodies, many structural alkaloids and glucosides and flavone derivatives. Mineral salts, gum, starch, sugar, glucose, most colored tannates and alkaloidal salts are when pure insoluble or only slightly soluble in chloroform. When mixed with alcohol and then with water it separates largely from solution, carrying with it much alcohol, together with many water-insoluble substances that we often find desirable to separate from hydro-alcoholic solution. An example of the application of this principle may be made by dissolving one part of sugar in ten parts of diluted alcohol and then adding a solution of one part of resin in ten parts of chloroform. After shaking together the lower or chloroformic solution will be found to contain practically all the resin and the upper solution nearly all the sugar. The principle may be more pointedly illustrated by adding one part of syrup to one part of tincture of iodine and mixing with the product one part of chloroform. On separation of the liquids the iodine will be found to be mostly transferred to the chloroform, while the water above contains most of the sugar. This principle applied to galenic pharmacy becomes of great service in accom-

[1] Do not accept that acetone stands alone in producing inter-structural alterations. Other solvents possess both extractive and destructive qualities. For example, chloroform may prove very destructive, the by-products having peculiar qualities. In many cases water begins at once to react disastrously, and in nineteen days a mixture (infusion) is generally putrid.

plishing separations of substances that are abstracted together by hydro-alcoholic percolates, although to this date (1885) advantage is not taken of it in the making of any official galenical preparation.

When chloroform is studied systematically in its various relationships and attributes, it will doubtless serve as an important agent in developing the better plant preparations that are sure some day to supplant the present crudities in official galenical pharmacy. In this connection it must be repeated that chloroform *alters* many delicate plant structures if allowed to stand in contact therewith. Chloroform water is thus very inadequate as a preservative of plant ultimates, as experience has taught the writer of these comments.

AMYLIC ALCOHOL.

This solvent is of importance because of its usefulness in extracting some alkaloids from plant solutions after they are made alkaline, quinine being an example. Its irrespirable vapor renders it very disagreeable to manipulate, but a product of such extraction may be readily freed of the solvent and need have no odor. Its solvent power on alkaloids and natural structures is shown by the fact that fresh sanguinaria at once yields to it its red salt.[1] That it is preferable as a solvent to some other liquids that are equally good solvents is shown by the fact that no change in sanguinaria extractive occurs in twenty days. (See Acetone.)

ACETIC ETHER.

This solvent is never found in commerce free from (either or both) water and alcohol. It has been entirely overlooked in galenic pharmacy, possibly being displaced by its co-laborer, sulphuric ether. It unquestionably possesses attributes that render such neglect inexcusable. While the Pharmacopœia of the United States wisely gives place to and describes it, there is no official preparation in that work that either contains or uses it in the process of manipulation. It possesses nearly all the serviceable qualities of sulphuric ether and is less objectionable in many regards. In many places where sulphuric ether is employed in pharmacy, acetic ether might be substituted to advantage.

Acetic ether mixes freely with members of the second and third classes of solvents,[2] and with most volatile oils. For example, one part of turpentine and three parts of acetic ether mix transparent, but upon further addition of turpentine become milky. In this reaction the moisture of alcohol that is present in commercial acetic ether possibly accounts for the milkiness when the proportions are reversed. It freely dissolves about half its bulk of liquid petrolatum, becoming milky when the proportions are increased to equal amounts. The liquid part of petrolatum is naturally quite soluble in acetic ether, the paraffin dissolving more slowly. Acetic ether boils at about 76° C. (169° F.), a fact that in many cases gives to it a great advantage over sulphuric ether which is extremely volatile.

[1] Sanguinarine is often given as an example in these notes. This is because the color is so marked. Other alkaloids and alkaloidal structures require detailed chemical tests for identification. Some of these in textural form seem even more evanescent than are the alkaloids of Sanguinaria. There are, however, exceedingly stable alkaloids, strychnine for example.

[2] See JOUR. A. PH. A., 6 (1917), 940–949. This article was written in 1885.

The odor is pleasant which cannot be said of sulphuric ether. The inhalation of the vapor does not seem to produce the unpleasant symptoms that follow inhalation of the vapor of sulphuric ether, thus adding further to its favor.

Acetic ether dissolves fat, oils, wax-and-fat-bound chlorophyll, many resins and alkaloids, vegetable acids and glucosides. Ammoniacal acetic ether is an excellent abstractor of many alkaloidal drugs, so far as the alkaloidal products are concerned, first breaking them out, and next carrying them away.

It dissolves in about eight parts of water, but does not reciprocate, for water is taken up by it very sparingly. This is a very important quality as contrasted with sulphuric ether. For example, with sulphuric ether solutions of alkaloids, by rotation with acidulated water, the sulphuric ether disappears by solution in the water, while acetic ether very much more slowly wears out. Should acetic ether come into use in regular pharmacy,[1] and be allowed to remain in any pharmaceutical preparation whatever, even in small amount, the medical profession would necessarily have to be educated concerning its character. The general impression would be that such a preparation had *soured*, few modern physicians being sufficiently familiar with the nature of menstruums of drugs to distinguish between the fragrance of acetic ether and the "sour" odor of acetic acid. Naturally, at this date, acetic ether may only be employed as an aid to systematic plant studies where as a final result the menstruum will be totally dissipated.

SULPHURIC ETHER.

This is an excellent menstruum for the abstraction of fats, fat-bound chlorophyll and associates, balsams, waxes, some resins, many alkaloids, vegetable acids and glucosides. It also dissolves many neutral principles, resinous bodies and a few acrid constituents of plants, as for example, the acrid constituent of Indian turnip (probably of other species of Arum) which is practically insoluble in both alcohol and water. Alkaloidal salts are mostly insoluble in ether, although, as aforestated, many alkaloids in a free state readily dissolve in it. In this way ammoniacal sulphuric ether serves as a breaker of natural alkaloidal structures and as an abstractor of alkaloids from natural combinations, in some plants where neutral ether is valueless. As an *excluder* of undesirable extractives sulphuric ether is often even more valuable than alcohol. In many cases, such as fatty, alkaloidal drugs, preliminary percolation with sulphuric ether can be resorted to without fear of disturbing the desirable alkaloidal textures of the plant, a manipulative feature we cannot often indulge with alcohol. Thus powdered ergot can be extracted by means of ether, then dried and next percolated with dilute alcohol, when it will be found that the hydro-alcoholic menstruum, minus the fat, will contain all the desirable constituents of ergot, but also it yet contains mineral salts objectionable for hypodermic use. The preparation is still crude but much better than the official fluidextract and can next by neutral liquid precipitants be depleted of its earthy salts, leaving the desirable constituents intact. Many seeds may be treated in the same way with advantage. It may be repeated that

[1] I here use the term "regular" as applied in medicine. An "irregular" is he who seeks in the outside for opportunities which the inside (regular) authorities have not recorded. To me the term has no terrors.—J. U. L.

sulphuric ether does not dissolve gums, starch, sugar, glucose, albumen or mucilage, but is the rational solvent for wax, fat-bound chlorophyll and all volatile oils. It should be remembered that commercial sulphuric ether (Pharmacopœia, 1880) contains alcohol enough to become a modifying factor in many cases, and thus these remarks must be considered as being applied to concentrated or stronger ether of the Pharmacopœia of 1880.

In some respects ether occupies a position different from that of any other menstruum, including its near companion, acetic ether. Thus carbon disulphide, benzol and benzin will neither dissolve in nor dissolve water, while chloroform to saturation is taken up by water to the extent only of about one-half per cent. Sulphuric ether, upon the contrary, dissolves water largely, and in turn is dissolved by about ten volumes of water. This character is of great value in galenic pharmacy, as by taking advantage thereof it is possible to abstract the ether from solutions it has made of desirable substances, and by introducing water (repeated shaking with water) in its stead, obtain the desired material as a precipitate. This method can be adapted (without heat) to the breaking up, disintegrating of associations of natural plant adhesion constituents in which ether is primarily employed as a solvent, and water is used next as a precipitant.

The inflammable and volatile nature of ether renders it necessary to exercise manipulative care, especially in laboratory work on a large scale, while the fact that its vapor is heavier than air must not be overlooked. In this connection consider the remarks on acetic ether.

BENZIN AND BENZOL.[1]

These rationally follow sulphuric ether, the remarks concerning that substance applying in many respects to these liquids. They are excellent solvents for fats and some resins, benzol especially being a solvent for balsams. They do not dissolve alkaloidal salts in either the natural plant textures or the artificial compounds. They refuse to soften or abstract in the least albuminates, sugar, gum, starch, woody fibre and the usual plant coloring matters, excepting wax-or-fat-bound chlorophyll. Some alkaloids and neutral principles are dissolved by them but the list is not extensive. In some aspects they are superior to any of the solvents previously mentioned for water-free, fatty drugs. As a rule fatty tissue may be percolated with them until the fat is practically abstracted without disturbing associated constituents, provided the tissues are water-free and porous. Neither of them will dissolve in or be dissolved by water, a property that renders them superior to sulphuric ether for some purposes, inasmuch as the moisture abstracted from a drug by sulphuric ether is often considerable, producing therewith a menstruum that will dissolve bodies that are insoluble in pure sulphuric ether. Both benzol and benzin have great penetrating qualities and do not in the least expand any vegetable structure known to this writer. For this reason a powder in a percolator may be more tightly pressed (compact), for their use than for most solvents, providing the powder is dry and porous. One unfortunate condition concerning commercial benzin is the contamination therewith of offensive hydrocarbons and unknown mixtures that do not readily evaporate from drug textures. They

[1] The scientific and commercial terms applied to these substances are perplexing as a study of their histories demonstrates.

remain often tenaciously adhering to the substance that has been operated upon, even a temperature of 100° C. being insufficient to expel them. In this connection, *adhesion* plays a prominent part. Very volatile substances may remain most tenaciously attached to vegetable powders, the final portions often refusing to be dissipated under temperatures far above the boiling point of the adsorbed liquid. This problem, already mentioned, we consider in our remarks on "Physics in Pharmacy," or mass action of materials.

For many purposes in applied pharmacy, such liquids as these (benzol and benzine) are irreplaceable. The writer believes that in time to come they will occupy important authoritative positions in the preparation of perfected galenical products.

CARBON DISULPHIDE (BISULPHIDE).

This highly refractive liquid possesses strong solvent properties for fat-bound chlorophyll, fats, balsams, wax, some resins, a few alkaloids, a few glucosides and other neutral principles. It does not dissolve alkaloidal salts, gums, albumen, glucose, sugar, mineral salts, the brown coloring matter of dried plants and substances generally which, by reason of our ignorance of their structures, we denominate "the usual constituents of plants."[1] It may best be classed (see Class 3, JOUR. A. PH. A., 7 (1917), 137) with benzol and benzin, as its solvent properties resemble those liquids. For the purpose of abstracting fats and oils from aqueous plant liquids, it is equal to chloroform, and may afterward be separated from the liquid as readily, owing to its great specific gravity. It is cheaper than chloroform, thus favoring its use in manufacturing on a large scale, but it possesses the disadvantage of being inflammable and volatile, the mixture of its vapor and air forming an explosive compound. Indeed, it has been asserted that spontaneous explosions have resulted in its manipulation. The odor of the commercial liquid is more offensive than that of benzin, although the Pharmacopœia described it as a liquid that should have "a strong, characteristic, but not fetid odor."

It has been stated that odorless carbon disulphide is a commercial possibility and that, were the demand to arise, such a desirable condition of the substance would probably appear in our market, the offensive odor being ascribed to foreign bodies and not to CS_2. Carbon disulphide does not expand cellular matter. Drugs abstracted by it should therefore be perfectly dry and porous, as this liquid has no affiliation for water. It is impractical to use carbon disulphide as a menstruum should it remain even in traces in the finished plant pharmaceutical preparation, owing to its rank odor and poisonous nature. Hence it should be employed only as a preliminary menstruum in removing objectionable substances such as fat and oil, or in making separations of plant constituents, from which it is afterward freed by distillation.

OIL OF TURPENTINE (TURPENTINE).

Fats, oils, many resins and some coloring matters dissolve in this liquid. The fact that it is cheap and separates so sharply from water renders it desirable

[1] Let me repeat that traces of most vegetable materials are likely to be taken by any liquid if one is inclined to demand the preciseness of exactness. This is not essential in a general sense.

in some forms of plant manipulation. Turpentine emulsions are difficult to make permanent, which theoretically indicates its desirable employment where emulsions disturb analytical processes. However, in practice, the reverse is true. If a mixture of turpentine and water be well shaken together, the lower, aqueous liquid becomes milky, the white emulsion remaining for months, probably permanently. This is true of no other mixture of liquids named in this series.

PETROLATUM AND LIQUID PETROLATUM.

Soft Petrolatum, U. S. P., 1880. This unctuous substance is increasing in pharmaceutical use, but chiefly as a carrier of remedies to be employed for inunction rather than as an abstractor and solvent. Plants yield their fats, oils and many resinous and balsamic constituents to hot petrolatum, which agent can thus be used as an extractor for this purpose. It is, however, as before stated, chiefly employed as an excipient, although occasionally it is desirable as an abstractor. It is a poor solvent for most energetic plant constituents, even when hot, although when melted it will abstract and purify alkaloids that have been liberated from acidulous combinations by an alkali. If, for example, an impure alkaloid, the alkaloidal constituent being soluble therein, be digested and agitated in hot petrolatum, it will generally be found that although the alkaloid is dissolved, most coloring matters will remain undissolved. By rotating the alkaloidal petrolatum saturated with acidulated hot water, the alkaloid is quickly removed in a very pure condition. This method of purifying alkaloids can be made of great practical utility in cases where the alkaloid is soluble in petrolatum. Since (unlike most menstruums) petrolatum has no affinity, or very little, for the extractive coloring matters of plants, it may be perceived that a consideration of this agent in the light herein indicated is not unwarranted. It is probable that in a time to come, it will be a useful factor in making the perfected pharmaceutical preparations of plants yet to be developed, provided pharmaceutical thought and action are not paralyzed by some unforeseen intrusion.

Liquid Petrolatum.—This substance possesses an advantage over petrolatum in that it is fluid at ordinary temperatures and yet possesses to a degree the solvent power and other characters of melted petrolatum. That which has been recorded in the preceding paragraph concerning petrolatum may be applied to this substance. Notwithstanding its fluidity, the penetrating and abstracting action of liquid petrolatum is much enhanced by a high temperature.

The Medicinal Plant Garden, which is maintained by the College of Pharmacy of the University of Florida at Gainesville, will prove of interest to the pharmacists who will attend the Convention at Miami next year.

The perennial group of plants in the Garden is perhaps the most interesting because its numbers have been assembled from so many parts of the world. Thus, for example, we find here the West African tree which yields Acacia; the Russian turpentine pine; the Spanish Cork Oak which produces cork for stoppers, linoleum, life preservers, etc.; the East Indian Nux-vomica tree; Ginger plants from Jamaica and China; the Japanese mulberry, the leaves of which feed the silk worm; the Central American Logwood tree which produces a violet dye as well as an astringent drug; the South Asiatic Turmeric plant. These are only a few of the many interesting plant immigrants to be found in the Medicinal Plant Garden. It is learned that there are now over one hundred and fifty different species under cultivation in the garden.

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STANDARDIZATION OF DIGITALIS, IN THE FRENCH CODEX.

(*Bull. sci. pharmacol.* (1930), 37, 35.) The following resolutions have been presented to the League of Nations by Professor Tiffeneau. In the French Codex for 1930 physiological assay will be adopted for digitalis (powdered leaves). Details of the proposed methods of assay will be sent to interested persons, in order to obtain their comments. Powdered digitalis only will be official. The whole leaves will be excluded. The potency of this official powder will be that of the international standard, with a tolerance of 20 per cent, above or below it. The powder will contain 3 per cent of moisture. In pharmacy, standardized digitalis powder must be supplied either in sealed ampuls containing 1 or 2 Gm. or in sealed bottles containing 5 or 10 Gm., and when one of these containers is opened the whole of the contents must be used at once. The preparation and control of tinctures and other preparations of digitalis will be subject to the conditions prescribed in the Codex for other preparations. The question of digitalis preparations for veterinary use is under consideration.—*Quarterly Journal of Pharmacy and Pharmacology.*

THE ANTIQUITY OF THE DRUG STORE LOAFER.

In digging out an apothecary's shop in Pompeii the workmen brought to light a notice that confronted visitors to the place two thousand years ago: "Otiosis non est locus; discede, morator." "This is no place for idlers. Loafer, get out!"

DRUG DISPENSING IN A LARGE HOSPITAL.*

BY R. S. FUQUA.

I have been asked to submit a paper to this section dealing with some of the practical problems connected with hospital drug dispensing. As many of the problems encountered in this work are peculiar to the individual hospital, or to hospitals generally, it has occurred to me that most of you would prefer a general outline of the methods followed in a large institution of this kind.

In discussing pharmaceutical work in hospitals, it may be well to remind you that dispensing methods in vogue to-day in one institution may vary widely from those employed in others of similar size and type. The need for pharmaceutical service is less pressing in some types of hospitals than in others, and in some hospitals a separate department for this work does not exist. In the very small hospital the drug-room may represent a separate storeroom for drugs and chemicals, rather than an active dispensing unit.

The hospital pharmacy as a well-equipped, efficient unit, is a more or less modern development. It has been only a few years since such departments were restricted generally to the very large, or to the well-financed institutions. To-day we find many of the comparatively small hospitals maintaining creditable pharmacies, and employing registered pharmacists to provide this needed service.

Let us look in on the hospital pharmacist to see what some of his problems are, and in what respects they may differ from those of the retail druggist. To begin with he has no complaint to offer for a lack of "customers." The hospital wards are filled with them. The operating rooms, accident rooms, laboratories, etc., all need items which he must supply from his stock of chemicals and drugs. If the hospital maintains an out-patient department, or dispensary, his problems are more complicated and the demands for service multiplied. How to supply these varied demands properly and promptly, and at the same time economically, is not a simple proposition. It should be remembered that few hospitals are financially able to provide for the operation of all of their various departments according to the ideas of those directing these separate activities. The pharmacy must cut expenses wherever this may be done without involving a sacrifice in quality of materials used, or a curtailment of necessary services. Carelessness and waste have no more place here than they have in the well-regulated retail pharmacy.

In any large hospital having numerous wards, we will find hundreds of patients being treated for various ailments. It would be an extravagant procedure for physicians to write individual prescriptions for each of these many patients; resulting not only in the waste of much unused material, but also requiring the hospital to maintain a pharmaceutical staff out of all proportion to the actual needs of the institution. Such a procedure would result, too, in a needless delay in beginning, or changing medical treatment. The usual method employed consists of keeping a well-stocked medicine cabinet in each ward, with an assortment of drugs covering a wide range of conditions. These are available for immediate single doses, or for the continuous administration of any of these standard

* Section on Practical Pharmacy and Dispensing, Baltimore meeting, 1930. No discussion.

drugs or preparations. Occasionally, of course, it is necessary to have individual prescriptions prepared to provide proper treatment for unusual conditions.

The task of supplying the large quantities of drugs and chemicals used by wards and in the laboratories of a large institution is no small one, even under the conditions outlined. If the pharmacy is operated on an economical basis the manufacturing end of this work will assume large proportions. With tax-free alcohol at a cost of fifty to sixty cents per gallon available, tinctures can be manufactured at a very low cost. These tinctures in turn form the basis of numerous other hospital preparations. It may be necessary to purchase such tinctures as require a biological assay to determine their potency, but chemical assays present no great difficulty, and may be carried out with reasonable accuracy in the hospital pharmacy. Confronted with the necessity of manufacturing our own tinctures, spirits, etc., in order to obtain such economies as are offered by tax-free alcohol, we naturally turn to the manufacture of such other needed pharmaceuticals as may be produced economically. In the Baltimore institution with which I am connected, we have found it both necessary and economical to install some machinery and other labor-saving devices, in order to keep up with the demand for some of these products. Steam kettles, mixing machines, machines to grind and mix powders, an ointment mill and a small tablet-compressing machine have been found useful on occasions.

Let us look into the hospital dispensing pharmacy to see how some of this material is dispensed. We see lined up here on work tables quite an array of metal drug trays, or baskets, containing a varied assortment of empty bottles, boxes and jars. Each hospital ward has sent one of these down in the morning, with an order for such items as may be needed to replenish the ward drug supplies. On looking over these orders we find that some items are ordered for which no empty containers are sent: small quantities of drugs or preparations not regularly carried in ward stocks, but needed for some individual patient. We also find attached a few special prescriptions, and physicians' orders for narcotic tablets or pills. Hypodermic tablets are dispensed in small homeopathic vials; the oral tablets or pills in amber bottles. Narcotic tablets are sent up to wards in lots of twenty-five on these orders, but before any such drugs can be administered to the patient the physician must enter an order in the ward records, covering the dosage and quantity desired.

A further examination of these morning drug orders will reveal that tablets and pills constitute only a small portion of the needed drug supply. Various solutions and mixtures are ordered. Enough powders and capsules are wanted to keep one pharmacist busy all morning preparing them. We have here the gallon bottles of boric acid and phenol solutions; the jars for green soap and ointments to be filled, and the containers for disinfectants. Oral hygiene is popular in hospitals and, as a consequence, we have pint bottles to be filled with our standard mouth wash and Dobell's Solution. The patients on the free wards are supplied with tooth brushes and paste at the hospital expense. The tooth paste which we manufacture must please them, for we note that several dozen boxes are ordered. Much of this material must be previously prepared and placed in containers from which it may be dispensed quickly, or the drug trays could not be filled and returned to the wards in the allotted time. All of this work

must be done in the mornings so that drugs can be sent to the wards in the early afternoon.

The afternoon in the hospital pharmacy, however, will bring no extended periods of rest. We come back from lunch to tackle a pile of prescriptions, and orders which in the filling will require considerable time and care. Also there are the numerous solutions to be made up and filtered; and the capsules and powders which must be ready for use on the following day. We will find time, too, for making suppositories; and for filling orders from the laboratories and operating rooms. When night comes we are ready to close up shop for the day, and do so at seven o'clock. This is one feature of our work which would appeal strongly to our friends in the retail stores.

With the hospital pharmacist, however, as with the retail pharmacist, his responsibility does not cease when he parts company with his medicines. The labels on the containers which he has sent out must be legible, and the directions for use, if such are on the label, must not be confusing. We have given considerable thought at our institution to the question of proper labeling. Ambiguous or poorly written labels are fruitful sources of error—especially so in a large hospital. At present we are using printed labels on practically all hospital drug containers and, in instances where materials or names are of similar appearance, we have tried to design labels which are not likely to be confused by nurses or physicians. It has been a source of satisfaction to our department and to the hospital that errors in the administration of medicines furnished have been extremely rare. This, in spite of the fact that more than four hundred nurses are on duty in this institution.

In concluding this paper I would like to say that the present trend in hospital designing and building offers an opportunity for pharmacists to make this branch of pharmacy an important one. Modern hospitals are being built with space and equipment included for this service. The importance of the pharmacy as an adjunct to medical and surgical service, and the place we will occupy in future hospital developments, will depend largely on the energy and ability of the individual pharmacists in this field.

THE HYDROGEN-ION CONCENTRATION OF AROMATIC ELIXIR.*

BY JOHN C. KRANTZ, JR., AND C. JELLEFF CARR.

INTRODUCTION.

The formula for the preparation of Aromatic Elixir was introduced into the Pharmacopœia of 1890. In this formula precipitated calcium phosphate is employed as a filtering agent. In the Pharmacopœia of 1900 the formula was changed to include purified talc as a filtering agent instead of precipitated calcium phosphate. It is a matter of general knowledge among pharmacists that the basic hydrated magnesium carbonate of the Pharmacopœia can be used advantageously in place of talc as a filtering agent. The filtration is more rapid and a clear finished product is obtained more readily. Magnesium carbonate has been objected to in

* Section on Practical Pharmacy and Dispensing, A. PH. A., Baltimore meeting, 1930.

many preparations as a filtering agent on account of the alkalinity which it imparts to the product. Furthermore, Parry (1) observed that magnesium carbonate when used in a preparation containing oil of cassia caused the product to become yellow upon standing.

With these facts established the authors decided to investigate the hydrogen-ion concentration of aromatic elixir and if possible determine why, of the two filtering agents, magnesium carbonate and talc, the former is the more efficient.

EXPERIMENTAL.

A sample of U. S. P. precipitated magnesium carbonate $(MgCO_3)_4.Mg(OH)_2.5H_2O$ was shaken with distilled water and filtered. Several samples of aromatic elixir were prepared, using the product as a filtering agent. The hydrogen-ion concentration of these products was determined electrometrically, using a Wilson (2) electrode.

Table I shows the results of these observations:

TABLE I.

Aromatic elixir prepared with precipitated magnesium carbonate.	p_H.
Sample 1	9.15
2	9.11
3	9.10
4	9.20
5	9.12
Distilled water shaken with precipitated magnesium carbonate	9.80

These results indicate that aromatic elixir prepared with precipitated magnesium carbonate as a filtering agent is distinctly alkaline, possessing an alkalinity which is approximately equivalent to a $\frac{N}{100,000}$ sodium hydroxide solution.

Following these experiments several samples of talc marked U. S. P. were shaken with water and filtered. Although the Pharmacopœia requires neutrality to litmus for water shaken with talc, it was found that frequently distilled water when agitated with talc became quite acid. One sample was found to have a p_H 3.73. However, nearly all of the samples of aromatic elixir prepared with talc as a filtering agent were practically neutral. The p_H of the elixirs prepared with various samples of talc marked U. S. P. was between 7.00 and 7.35.

In order to determine whether or not it was the alkalinity which precipitated magnesium carbonate imparted to the elixir which facilitates filtration, the following experiment was conducted. A sample of the elixir was prepared using in place of water a buffered sodium carbonate solution of approximately the same p_H as a saturated solution of precipitated magnesium carbonate in water. The presence of this alkalinity did not facilitate filtration with talc which indicates that the alkalinity imparted by precipitated magnesium carbonate is not responsible for its superior qualities as a filtering agent.

To further study the influence of hydrogen-ion concentration upon filtration in this product, a sample of finely divided magnesite or normal magnesium carbonate was employed as a filtering agent. This product produced a clear filtrate as rapidly as did the basic hydrated salt. The hydrogen-ion concentration of the elixir pre-

pared with normal magnesium carbonate as a filtering agent is p_H 6.8. This indicates also that the alkalinity imparted by the precipitated magnesium carbonate is not a factor in aiding filtration.

Using precipitated calcium phosphate as a filtering agent two samples of aromatic elixir were prepared. The hydrogen-ion concentration of one sample was p_H 5.95 and that of the other p_H 6.30.

A series of experiments was conducted to determine the effect of the presence of the alkalinity imparted to aromatic elixir by the use of precipitated magnesium carbonate upon certain alkaloidal salts dissolved therein. These solutions were stored in flint glass in direct light over a period of two months.

Table II records the results of these experiments.

TABLE II.

Alkaloidal salt.	Concentration.	Discoloration.	Precipitation.
Morphine sulphate	0.120 Gm. per 90 cc.	Yellow	None
Codeine sulphate	0.120 Gm. per 90 cc.	Slightly yellow	None
Strychnine sulphate	0.060 Gm. per 90 cc.	None	None
*Morphine sulphate	0.120 Gm. per 90 cc.	Slightly yellow	None

* This was dissolved in an elixir prepared with talc p_H 7.0.

These results indicate that the alkalinity of aromatic elixir prepared with precipitated magnesium carbonate as a filtering agent is not sufficient to precipitate the foregoing alkaloidal salts. It does, however, increase the rapidity with which morphine is converted into pseudo-morphine (3) by contact with atmospheric oxygen.

CONCLUSIONS.

1. The hydrogen-ion concentration of samples of aromatic elixir prepared with various filtering agents has been determined.

2. Normal magnesium carbonate seems to be admirably suited for use as a filtering agent in this preparation.

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PHARMACEUTICAL RESEARCH LABORATORY,
SHARP AND DOHME.

FOAMING TOOTHPASTE.

This product contains seven and one-half parts of pulverized medicated soap, 3.75 parts of extracted pulverized soap bark (quillaja), 480 parts of precipitated calcium carbonate and as much soluble carmine and aromatic oils as desired together with 120 parts of glycerin-gelatin mixture. The glycerin-containing gelatin solution is made from seven and one-half parts of white gelatin, 120 parts of distilled water and 210 parts of glycerin. The following mixture is used to perfume the preparation: 3.75 parts of oil of rose, 7.5 parts of oil of cinnamon, 33.75 parts of oil of caryophyll, 2625 parts of lemon oil, 90 parts of tincture of vanilla and 270 parts of alcohol.—*Pharm. Monatshefte*, through *Drug Markets*, September.

METHODS FOR THE EXTEMPORANEOUS PREPARATION OF SOLUTIONS OF MILD AND STRONG SILVER PROTEIN.*

BY MARVIN J. ANDREWS.

After receiving numerous queries concerning the method best suited to the preparation of Solutions of Mild and Strong Silver Protein it was decided to try various methods, and from the results of a representative group of students to determine the best method for the extemporaneous preparation of the solution. With this viewpoint in mind several methods were tried and results recorded.

Solutions of Mild Silver Protein were prepared by dissolving 46 grains of the crystal in enough distilled water to make 4 fluidrachms. This strength solution was taken as it is more difficult to prepare a concentrated solution than a weaker one, however, concentrations as high as 50% are not as frequently used as weaker solutions.

Solutions of Strong Silver Protein were prepared of two definite strengths. The first being of the same strength and quantity as for the Mild Silver Protein Solution to give a comparison of the two different solutions, and secondly by using 18 grains of the powder in enough distilled water to make 4 fluidounces, the strength and quantity most generally used.

Students were selected from the School of Pharmacy, University of Maryland, from the various classes, endeavoring in each case to select representative students, such as fast, slow, neat, careless, experienced and inexperienced. This selection was made in order to get results that would nearly correspond to the results, if possible to obtain them, from the retail pharmacists.

A stop-watch was used to record the time which was taken in each case, from the time the weighed powder or crystals were placed in the container until complete solution was effected. Time for weighing, pouring into the container and labeling were not recorded, as this time would remain constant for the individual in each case.

The Mild Silver Protein used was made by the Mallinckrodt Chemical Works, while the Strong Silver Protein was made by Merck & Co.

The following methods were used in preparing the solutions.

MILD SILVER PROTEIN.

1. The weighed crystals were placed in a glass mortar and about half the amount of distilled water slowly added, triturating rapidly without pressure on pestle until the greater part of the Mild Silver Protein was in solution, then the remainder of the distilled water added and contents triturated until all the salt was dissolved.

2. Solutions were made in two different ways by the bottle method. In one case the weighed salt was transferred to a dry bottle and the required amount of distilled water added, stoppered and shaken until the crystals were completely dissolved. The distilled water in this case must be added before shaking, as the solution has a tendency to foam. In the second case the distilled water was placed in the bottle and then the salt added, stoppered and shaken.

3. This method consisted of pouring the granules or powder into the distilled water contained in a graduate and stirring with a glass stirring rod until dissolved.

* Section on Practical Pharmacy and Dispensing, A. PH. A., Baltimore meeting, 1930.

RESULTS.

Students No.	Method.	Time.	Method.	Time.	Method.	Time.
1	1	2′ 10″	2	1′ 25″	3	2′ 15″
2	1	1′ 35″	2	45″	3	1′ 50″
3	1	1′ 20″	2	40″	3	1′ 45″
4	1	1′ 30″	2	45″	3	1′ 55″
5	1	2′	2	1′	3	2′ 5″
6	1	2′ 25″	2	1′	3	1′ 50″
7	1	2′ 35″	2	1′ 10″	3	2′ 10″
8	1	2′ 6″	2	1′ 45″	3	2′ 20″
9	1	1′ 22″	2	1′ 18″	3	1′ 35″
10	1	1′ 16″	2	1′ 7″	3	1′ 30″
11	1	1′ 25″	2	1′ 45″	3	2′ 24″
12	1	1′ 26″	2	1′ 56″	3	2′ 6″

From the above results the best method for the extemporaneous preparation of Mild Silver Protein would be by method number two, that is by adding the water to the salt contained in the bottle or adding the salt to the water contained in the bottle. The fineness of the powder did not change the results to any appreciable extent.

STRONG SILVER PROTEIN.

The N. N. R. for 1929 states that "Solutions of Strong Silver Protein are best prepared by dusting the powder on the surface of cold water, and allowing it to dissolve without stirring or shaking. This requires about 10 minutes." After trying this method, using a 2- or 4-fluidounce graduate for containers, it was found that the time required for complete solution was from 20 to 40 minutes. As a result of this method the following methods were then tried.

RESULTS.—46 GRAINS IN ENOUGH WATER TO MAKE 4 FLUIDOUNCES.

Students No.	Method.	Time.	Method.	Time.	Method.	Time.	Method.	Time.
1	1	45″	2	1′ 3″	3	2′ 40″	5	2′ 35″
2	1	1′ 30″	2	3′ 8″	3	2′ 25″	5	2′ 45″
3	1	1′ 22″	2	1′ 30″	4	2′ 50″	5	3′
4	1	1′ 35″	2	2′	3	2′ 5″	5	3′ 5″
5	1	60″	2	2′ 40″	3	2′ 45″	5	2′ 50″

RESULTS.—18 GRAINS IN ENOUGH WATER TO MAKE 4 FLUIDOUNCES.

Students No.	Method.	Time.	Method.	Time.	Method.	Time.	Method.	Time.
6	1	35″	2	50″	3	42″	5	1′
7	1	32″	2	1′ 54″	3	34″	5	50″
8	1	25″	2	42″	4	37″	5	45″
9	1	1′ 5″	2	1′ 15″	3	35″	5	1′ 13″
10	1	32″	2	43″	3	34″	5	45″
11	1	45″	2	1′ 8″	4	1′ 4″	5	1′ 18″
12	1	40″	2	1′ 15″	4	1′ 36″	5	1′ 25″
13	1	32″	2	1′ 6″	4	2′ 2″	5	1′ 8″
14	1	42″	2	54″	3	55″	5	56″
15	1	57″	2	1′ 5″	4	1′ 55″	5	1′ 22″

1. The weighed Strong Silver Protein was transferred to a dry glass mortar, a few drops of distilled water added and rubbed to a smooth paste, then the remainder of distilled water added, triturating rapidly until the powder dissolved.

2. Transfer the weighed Strong Silver Protein to a dry glass mortar, add a few drops of glycerin and rub to a smooth paste, then add water slowly while triturating until solution takes place. (NOTE: Due to the viscosity of the glycerin and strong silver protein, there was a tendency of the salt to stick to the sides of the mortar and on the bottom of the pestle, but this was not the case when distilled water was used alone.)

3. The weighed Strong Silver Protein was placed in a clean dry bottle and all the distilled water added at once, then the bottle was stoppered and shaken.

4. The salt was added to the water contained in the bottle and the contents shaken until all dissolved. There was a tendency in both cases, 3 and 4, for the salt to stick to the sides of the bottle, and a great deal of shaking was required.

5. The powder was dusted on top of distilled water contained in a graduate, then stirred with a glass stirring rod. There was a tendency in this case for the powder to form a ball, the outside of which was wet and the inside dry.

In conclusion from the results obtained in preparing both the concentrated and weaker solutions of Strong Silver Protein it appears that the quickest method is to make the solution in a glass mortar, using distilled water as the solvent. This method differs from the bottle method which appears to be the one best suited for the preparation of Solutions of Mild Silver Protein.

SCHOOL OF PHARMACY,
UNIVERSITY OF MARYLAND.

ABSTRACT OF DISCUSSION.

Wm. F. Reindollar asked relative to the percentage strength of the solutions. He thought there might be some difficulty with the strong solution, in ascertaining whether the salt was completely dissolved or not. The author stated that the percentage strengths of the solutions were approximately 1 and 20 per cent, and that complete solution in the case of the stronger solution was determined by passing a strong light through the solution.

Wm. Gray said that by using warm distilled water the solution can be more quickly obtained.

Louis Saalbach recalled that when the Strong Silver Protein solution was placed on the market under a trade name the manufacturer recommended using a few drops of glycerin in the water. He had no difficulty with the solution but pharmacists had different ideas relative to what a small amount of glycerin meant. He thought that a few drops of syrup would answer as well as the glycerin and may not be as irritating when the solution is used, as an injection. He agreed with the author on the method of preparing the Mild Silver Protein solution, but said the water should be placed in the bottle first. The author said that further questions might have been brought up relative to why he did not use argyrol and protargol. He said he had used argyrol and protargol also, but did not mention them in the paper as they were not official and only the official salts were discussed in this paper.

Relative to warm distilled water, the author said that it required a little time to heat the distilled water and the object of the paper was to determine a quick method for the preparation of the solution.

F. M. Holt asked whether it was permissible to add glycerin or syrup to these preparations.

J. Carlton Wolf said that after talking with a number of physicians in Baltimore he did not believe it advisable to use glycerin, especially if the solution was to be used in the eye, but other than that there seemed to be no objection.

Wm. Gray said that there were differences of opinion relative to the keeping qualities of the solution.

F. W. Nitardy referred to a solution of Mild Silver Protein which was about a year old, and was tested bacteriologically. There was a slight precipitate at the bottom of the bottle

but from examination it did not seem to be less effective. He thought that the solution of the Strong Silver Protein would not keep as well.

Adley B. Nichols said that he had been in touch with the manufacturers of argyrol and they had said that it is best to prepare a fresh solution. They did not give any definite time, but said that a solution three or four weeks old would not be as satisfactory as one freshly prepared. They cautioned against making a solution to be used from time to time and also against making a fresh solution and adding to it an old solution. From his own experience he said there is quite a difference in the effect on the eye of an old solution and a freshly prepared solution.

John R. Minehart confirmed the statement made by the former speaker in reference to the therapy. He said that certain dermatologists refused to use a protein solution of silver if it had been prepared more than five days, and he also stated that ill effects had come from using old solutions. He said he always instructed students to use a label saying this preparation should not be used after a certain date, namely, ten days after the date of preparing. He had found that some patients set aside bottles of solutions prepared on prescriptions and then after several months had used the same preparation with the result of causing irritation.

PERSONAL CONTACT RELATIONS WITH THE MEDICAL PROFESSION.

BY ANTON HOGSTAD, JR.

Pharmacy has much to offer to the profession of Medicine. Likewise the pharmacist can learn much from the physician, provided conditions are such as to warrant an atmosphere wherein the pharmacist assumes the rôle of an associate to the physician.

For the most part, American pharmacists have sadly ignored or overlooked one of the most interesting, instructive and essential phases of the daily conduct of their business. They have been content to remain within the four walls of the store, to merely greet the physician with a cheery "Good Morning" and then to calmly await whatever prescription patronage that the physician in question chooses to direct to this particular store.

Many are prone to feel and many likewise say that the physician does not care to coöperate with the pharmacist. This is not true. It is true, however, that physicians are not coöperating with the pharmacists in availing themselves of the special type of service that a pharmacist should render, but there are many reasons for this status of affairs.

One can hardly expect a physician to approach the pharmacist in an atmosphere that bespeaks only of a varied lot of side lines, including the luncheonette. Likewise, one can hardly expect a physician to seek the assistance of one who has seen fit to close his textbooks at commencement time, with the feeling that now college days as well as state board days are over, that there is no further need for study. Should not commencement time be looked upon in just what is implied in these words—commencement time rather than the close of the period? Further, one can hardly expect the physician to seek the advice and counsel of the pharmacist who fails to read medical journals as well as pharmaceutical journals. Does the average physician get the impression when he steps into a prescription room that it is a place of scientific achievement? Hardly! Where is the Library? Outside of the United States Pharmacopœia, National Formulary and a dispensatory, and in many cases old editions of these books, one notes the complete absence of a library. Yet the pharmacist claims to be a professional man.

For the most part we are willing to agree that American pharmacy is in a chaotic condition. Let us not blame the individual pharmacist altogether for this condition of affairs. Let us bear in mind that he is but a part of a system that has been brought into being, a system in which he has, as an individual, played a very minor rôle. Let us look unto our colleges and our state boards as well. In our colleges we are chiefly concerned with the idea of handing out fact after fact, with but very little interpretation placed upon these thousands of facts. Where is the college of pharmacy that includes in its curriculum a course dealing with "Personal Contact Relations with the Medical Profession?" Where is the college that actually points the way for the hundreds upon hundreds of graduates to make use of this massive amount of fact-information as required for examinations? In seeking the cause for this chaotic condition of affairs let us look unto the ancient custom of drug store experience that is required before a boy or girl can take the state board examinations. Many a boy as well as many a girl has been badly warped by poor business psychology and business methods of the preceptor.

Out of this chaotic condition of affairs there will emerge a practice of pharmacy that will be truly professional. We have witnessed the passing of the bearded apothecary on the corner in his quaint and dingy shop. We have witnessed the inroads made by the chain stores, offering a type of competition that a real pharmacist need not fear. We have also witnessed the creation of the so-called modern type of drug stores, which for the most part are nothing more or less than half-baked department stores—stores that have set aside a small section to the rear for the prescription department that to-day, in many cases, is a liability rather than an asset. Here and there we have also witnessed the creation of so-called ethical prescription shops; this is especially true in the metropolitan areas. These shops are rapidly increasing in number and beyond a doubt will play an important rôle in the future American pharmacy with the net result that in the metropolitan areas the drug stores as such will be strictly merchandising institutions. There can be no other result, when one compares the type of service as rendered by these modern prescription shops as compared to the sluggish movements of the prescription departments as an adjunct to these half-baked department stores.

During the past year, in the City of St. Louis, there has been brought into being an experiment in American pharmacy that is far-reaching. It is perhaps one of the most extensive experiments ever to be attempted by a retail druggist. I refer to *The Prescription Shop* of the Hesselberg Drug Store, which the writer has been accorded the honor and privilege of not alone designing but assisting in defining the policies as well.

Mr. Hesselberg has during the past seven years, as proprietor of the Hesselberg Drug Store, achieved a considerable measure of success as a merchant. But he was not satisfied. The competition as offered by chain stores in no manner whatsoever disturbed him. As a pharmacist he felt the tugging at his heart-strings that he was not serving in the capacity of a pharmacist. It is true that his prescription department in the rear of the store was about as successful as that found in any of these so-called modern drug stores. For the most part, however, his time was occupied by merchandising problems.

Then it was that the writer was called in for consultation and to create a prescription department that would be different from the prescription departments

as seen in drug stores of to-day. Let it be understood at the very outset that it is no easy matter to break away from the bondages of the past; to chart unknown seas is no easy matter. The ancient luggage of the past, including college instruction, was found to be adsorbed in a very close union. Mere brushing aside would not break up this adsorptive phenomenon.

It was then decided to overthrow every bondage of the past, including that of consulting business experts, fixture manufacturers and what not, and to create something that had not heretofore ever been brought into being—to bring into being a strictly scientific prescription shop that in every sense of the word would serve as an associate to the medical profession. This pharmacy is in operation and is distinctive—distinctive not only in the way of equipment and apparatus but likewise distinctive in relation to mode of operation and code of ethics. When face to face with the many questionable practices in the retail game, it is no easy matter to formulate an iron-clad code of ethics and then rigidly to observe it. Promotional plans likewise require much serious thought—how best to present the entire problem to the members of the medical profession. A mere letter setting forth in a general way the principles and practices would help, but only in a very small measure. An invitation to the physician to visit the shop likewise at the very outset could only bring in a result that would be far from satisfactory.

There was but one manner in which to approach the medical profession and that was through the avenue of personal contact relations. Then the question arose—"To what an extent is the average pharmacist capable of personal contact relations with the medical profession?" Is the college graduate in such a position as to gain the confidence of the physician? What would he or she talk about? Oh yes, there is the question of U. S. P. and N. F. preparations, but how many physicians are acquainted with the U. S. P., let alone the N. F.? It was soon recognized that the personal contact relations man had to be one who was familiar not alone with problems in pharmacy but in medicine and chemistry as well and one who could talk the language of the physician.

To-day it may be the calling on a dermatologist; to interest this individual one must necessarily be informed as to progress made in dermatology and the relations of ointments, lotions, etc., to his particular problems.

One can hardly expect a dermatologist to set forth his problems before the pharmacist. It is up to the pharmacist himself to point the way in which he can be of assistance to the dermatologist. Stereotyped, promotional information as set forth by promotional departments of manufacturing houses falls by the wayside in a very short time when discussing this or that problem. There needs must be a background of instruction and experience in physiology, histology, pathology, ointment therapy and what not when the dermatologist is approached.

To-morrow it may be a visit to one engaged in allergic work; they are face to face with many problems, involving not only medicine but chemistry, botany and private detective work as well. Chemistry of proteins play a very important rôle. Chemical constituents of pollen; serological relationships existing between species within a certain family as well as serological relationships between plant families must also be considered. Where is the physician who has been trained in botany and chemistry to handle these problems? To whom can he go for assistance? Perhaps, if in our colleges of pharmacy we took cognizance of some

of these facts our curricula would be materially changed from what they are to-day, and instead of mere fact presentation we would offer the boys and girls information of an interpretative nature, so as to prepare them for work of this kind. At least, if for nothing else, to stimulate them to the point where commencement time would really be the time for them to work and study.

In urology we find that the well-trained pharmacist can be of inestimable value to the physician. There, for instance, is the problem of the chemistry of the arsphenamines, including the colloidality of these compounds. The urologist obtains certain reactions and wonders at times why they take place. It is simply a problem in biochemistry which can be readily explained, involving certain phases of colloidal chemistry. In this connection it is indeed a pleasure to report that the writer was accorded the privilege of being seated about the festive board at the University Club on one occasion and also at the festive board at the home of a noted urologist in St. Louis some weeks ago. On both occasions some fifteen or more physicians were present, at which times the writer presented facts relative to the colloidality of the arsphenamines and in turn the physicians presented the clinical picture. Has the pharmacist nothing to offer the physician?

On another occasion the writer spent a very profitable and interesting evening with two allergists, discussing the various phases of allergy, with the net result that those present came away with a vast amount of practical information of a worth while nature.

On still another occasion a pleasant half-hour was spent with a gynecologist, at which time the question of the adsorptive values of charcoals in relation to uterine secretions was discussed. The gynecologist in this case sought advice from a pharmacist. During the past six months the writer has had the pleasure of six group gatherings with physicians in St. Louis, the "theme song" for the most part being "Colloidal Chemical Aspects of Medicine." These meetings are to be resumed again in the fall of this year.

These group gatherings are but a part of the policy of *The Prescription Shop*, through which the pharmacist becomes an associate to the medical profession. Such meetings likewise lend themselves very favorably to a discussion of mutual problems in Pharmacy and Medicine. On one occasion a physician remarked that it would indeed be a delight to see a prescription shop brought into being that would carry in stock only such items as listed in the U. S. P., N. F. and the N. N. R. Apparently he was greatly surprised when informed of the fact that seven or eight out of every ten prescriptions as written to-day call for proprietaries. He had graduated in medicine some years ago. Such meetings serve as a clearing house between the two professions and much good can be accomplished.

The writer has learned that the medical profession is desirous of coöperating with those engaged in pharmacy. Daily they are confronted with many problems which they feel the pharmacist as such, in his store, is unable to solve for them. Perhaps he is right in view of the attitude that the pharmacists take in general toward the scientific aspects of their profession.

Day by day *The Prescription Shop* is receiving inquiries for assistance along various lines. Knowing that this institution is one of service to the physician, the physician does not hesitate in placing his problems before its scientific staff. To serve one physician in this manner means that he will undoubtedly relate his

experiences to others, thus gradually building up a good will that is so essential in the proper conduct of a strictly scientific pharmaceutical service station.

To conduct such an institution means that counter-prescribing has no place whatsoever, provided there is a merchandising store as an adjunct to such an enterprise. Further, it means that there is no place whatsoever in the windows for the featuring of patent or proprietary medicines of any kind. In their place must be educational windows of the highest order, that bespeak of the calibre of the institution. To gain the good will of the medical profession there is no place in the code of ethics for commissions on prescriptions. There is no place for inferior drugs or drugs improperly kept. There is no place for an untidy prescription room.

There needs must be scientific literature that appeals to the physician. His journals must occupy a prominent place in the library of such an institution. The atmosphere of the institution at all times must bespeak of scientific achievement, wherein the fine art of the apothecary reigns supreme. The beautiful show globes—now almost forgotten—must be raised in all their glory, to add dignity, to set forth that the prescription shop is the workshop of an apothecary.

Fully registered and carefully selected men of this calibre alone find a place for work. Such institutions cannot afford to assume the responsibility of training pharmacists. That is up to the college of pharmacy. Politeness in manners—manner of approach to the members of the medical profession—must likewise be considered. Smoking in the prescription shop must be prohibited. A rigid double check system insuring accuracy at all times must be enforced to the letter.

Complete card indices and reprint files must also find a place in such an institution. Card indices of all physicians in the metropolitan areas and vicinity must also be compiled, as to location, type of practice, office hours, phone numbers, registration numbers and what not.

Conversation of such a nature that would lead one to suspect inaccuracy must be absolutely prohibited. Likewise profane language has no place in the code of ethics of an institution of this kind. Service of the highest order, wherein the patient need not come to the prescription shop but where the prescription is delivered to the home, perhaps before the patient arrives home, is a thing to be duly considered.

All of these things and many more come under the head of personal contact relations with the medical fraternity, for all happenings of a prescription shop are sooner or later reflected into the circle of the physicians. Once the integrity and honor of such an institution is shattered—well you know the story as well as I do. It would amount to a useless struggle.

Is it worth while? In answer to this let me ask the question, "Do you consider it worth while to be a pharmacist?" If so, why not be a pharmacist instead of a half-baked department store proprietor? Perhaps, for those in the later walk of life it is too late. Surely, for the student in college or the recent graduate there is a glorious future ahead, provided one's attitude is such and one's intitiative and progressiveness is such as to put forth the effort. It is a hard battle. It requires constant study. There are days of disappointment. The path is not just one of a bed of roses.

However, these things will not come to pass until our colleges of pharmacy take cognizance of the fact that our present college curricula are sadly lacking

in many respects. Would it not be much better to teach the boys and girls the best methods to pursue in selling one's professional knowledge rather than that of merchandising as practiced at the present time in our courses dealing with commercial pharmacy? Perhaps if such a policy were adopted there would be no need for our present courses in commercial pharmacy; no need for our model drug stores, as such, in our colleges of pharmacy. Perhaps some day there will be established a Chair at one or more of our colleges dealing with "Personal Contact Relations" or a title to that effect.

Let us awaken to the opportunities before us. Let us eliminate our present discussions dealing with chaotic conditions. Let us not look unto the solution of the problem from the angle of so-called commercialism, but let us seek the answer within the Profession of Pharmacy itself—the Theory and Practice of Pharmacy on the highest scientific plane. As yet we have not even scratched the surface in the rough marble that some day will lend itself to a masterpiece—a temple of scientific achievement in American Pharmacy. As yet we go along day by day—just chiseling, chiseling and chiseling.

DETAILING THE DOCTORS.*

BY J. H. WEBSTER.

In the relatively distant past, to the young pharmacist, unbelievably distant, but to the historian, only a few years ago, pharmacy had an intimate bearing to medicine. In fact, from the point of view of medical utility, pharmacy had heavy responsibilities comparable to those of medicine itself. There at least existed a more equal "medical division of labor." As a result, all pharmacists have inherited the birthright of professionalism and along with it multifarious phrases, worn out by common usage, telling of pharmacy as the handmaiden of medicine; the mother of medical science and other equally close relationships. But granted a thoroughbred beginning, our contemporary medical profession of to-day often fails to recognize its relative, discrediting the claims of pharmacy to a deference which a relative deserves. Disowned, disqualified, a brother without a keeper, pharmacy to-day stands alone and struggles alone.

Present-day struggles in pharmacy represent an attempt at adaptation. The relative of medicine must earn a living, and, in doing so, pharmacy has created a distinct place for itself in the world of things. New paths have been followed; new fields have been entered; the druggist became a merchant and then more than a merchant—he has become a chain store director, an expanding business man. To-day the complete modern drug store is a monument to variety, and also to successful adaptation. A place in the world of things has led to a place in the sun and pharmacists are making a satisfactory living; more than a living, a change in the order of the work has brought many desirable changes in the life of the pharmacist, to the extent that many of medicine's relatives would rather remain merchandisers than apothecaries. Like a prodigal son succeeding, the past is buried, in the present success. Led on and on by new worlds to conquer,

* Section on Practical Pharmacy and Dispensing, A. PH. A., Baltimore meeting, 1930.

pharmacists are more and more forsaking the ties of the past. A breeding and crossbreeding with business and merchandising have succeeded in significantly diluting the blood relationship with medicine. Pharmacy, in many cases, with each generation becomes more distant to its relative.

In a majority of cases this is true, with a number sufficient to make the condition not only notable but notorious, but by no means in all cases. There is another wing of pharmacy with a different viewpoint. Pharmacy, to them, having the qualities of a religion, has been closely related to medicine, is now and ever shall be. These pharmacists recognize a change in pharmacy but see in that change of the professional relationship with medicine only a metamorphosis and not destruction. "Change means life and life means change." Medicine of the past is different from medicine of the present; pharmacy could not remain static. If pharmacy has lost an intimate relationship to medicine it has been because of a failure in adapting itself to the inevitable changes which have taken place. Such is the viewpoint of this second group; one which points out the need for the pharmacist to discover his changing place in a changing relationship. The pharmacist must question his position. What is the situation in medicine to-day; how can he be useful as he was indispensable in the past? Where is his field and what are its limits? In such observations the thoughtful pharmacist is able to study his position, and by so doing open the door to new opportunities, opportunities beyond those of merchandising.

Playing the part of a questioning pharmacist, we can face these situations which such questions provoke. What is the situation in medicine to-day as it affects the pharmacist? There are certain facts known to us. In the first place, the field of medicine is a tremendously great one; one physician's share of the knowledge is a diminutive one. He is limited by his own capacity and the preponderance of science. Such a fact is recognized by medical men and attested by the specialization with which we are becoming so familiar.

A part of that burden of knowledge carried by the physician is medical therapy, still the method of treatment most commonly used. The administration of medicine represents one of three steps in treatment. It follows the diagnosis and the prescribing which are the most important phases of the cycle as well as the best known to the physician. The physician's training is devoted to the latter two. On the other hand, the pharmacist is skilled in the preparation of medicines and their efficacy; he is a specialist in drugs and medicines by virtue of the four years of training necessary to their dispensing. By all rules of logic, is it not reasonable to conclude that the pharmacist should share the burden of knowledge already hard pressing the physician, by assisting him in medicinal therapy which after all is the pharmacist's field? Can we avoid further concluding that here pharmacy has a usefulness desirable to both callings and most satisfactory to the laity? By the modern instrument of progress, namely specialization, pharmacists, the specialists of drugs and medicines, may work in their own field—and the profession of the past becomes adapted to the present.

So much for the principle behind a procedure already being practiced by the professional wing of pharmacy, namely, the detailing of doctors in utilizing pharmaceutical knowledge. The procedure is sound; it is founded upon reasonable purposes. It is a creator of business and an instrument of professional pharmacy.

A confusing point in detailing is that of the technique whereby the druggist may accomplish most and yet not bore the physician by tales of his own ability and interest in prescription business. To my mind, the U. S. P. and N. F. preparations offer a very desirable background for detailing, eliminating self-praise and obvious self-advertising. By talking to the doctors of pharmacy, of pharmacy's recommendations for the physician's armamentarium, of pharmacy's interest in having the doctor supplied with the most effective medicines—confusion on the point of technique is eliminated. The druggist in speaking for pharmacy is speaking for himself, a live, vital representative part of that kind of pharmacy of which he tells. Thus the doctor is impressed without the resentful tactics of the "best-house," "best-priced" brand of salesmanship.

In detailing the doctors, therefore, an opportunity is available for druggists to awaken new relationships with medicine. Through the medium of U. S. P. and N. F. preparations, that detailing can be effectively accomplished to the advancement of pharmacy and the pharmacist.

Left.—Prof. J. G. Dragendorff in his study. He was director of the pharmaceutical institute of Tartu from 1864 to 1894. He was an honorary member of the A. PH. A. Right.—Grave of Dragendorff in Rostock, Germany. The monument was erected by students from Russia who studied under him. The inscription on the monument reads "Dorpat 1864–1894." Underneath it reads "Prof. G. Dragendorff, born April 20, 1836, died April 7, 1898. His thankful students in Russia."

The 79th annual meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION will be held in Miami, Fla., during the week of July 28th, 1931.

DEPARTMENT OF BUSINESS MANAGEMENT

Conducted by Paul C. Olsen.*

COMMENTS, QUESTIONS AND SUGGESTIONS ARE INVITED AND WELCOME.

Readers are invited to submit comments, criticisms and suggestions regarding the material which appears in this department. The Editor also will undertake to answer questions regarding general problems of business management. Letters of general interest will be published, but the writer's name will not be revealed without his permission.

ARE YOU WONDERING WHERE YOUR PROFITS GO?

BY PAUL C. OLSEN.

Martin Daniels had one of those twentieth century curiosities. He had a business which showed month after month a small increase in sales and which, from all accounts, looked as if it certainly should be profitable.

Yet, when Martin Daniels looked in his check book there was another story to be told. His bank balance was never more than $100 or so and most of the time, especially after some extraordinary demand, it was considerably less than that.

It wasn't that Martin Daniels spent his money as fast or faster than he made it. No indeed. He still lived in a little house on Willow Street to which he had moved with his bride many years before. He drew from his business a regular and quite modest salary. That was all. Theoretically, at least he should have had quite a tidy amount of profits accumulating in his bank account.

"That's what puzzles me," said Daniels. "Year after year I go on making a profit according to my books but year after year I am no better off than when I started in business ten years ago. What I would like to know is what happens to the profits. Why don't I get them?"

"Now, look here," went on Daniels, pointing to one of his assistants, "he's just sold that woman a $1.50 fever thermometer. Mighty good value, too. Retails for $1.50; costs me $10.80 a dozen in dozen lots or 90 cents each. My total operating expenses average twenty-five per cent of sales which, on a $1.50 sale, is $37\frac{1}{2}$ cents.

"That certainly should leave me a clear profit of $22\frac{1}{2}$ cents for the transaction. Yet, I'd be willing to bet my bottom dollar—and I haven't very many of them in the bank—that I'll no more see that $22\frac{1}{2}$ cents profit than I'll see somebody walk in here this afternoon and buy a dozen pounds of bay leaves."

Unfortunately, Martin Daniels is right and in the purchase of those fever thermometers it is easy to prove just why he is right. According to the way Daniels is figuring, he made a $22\frac{1}{2}$ cent profit every time he sold one of those fever thermometers. That's theory for you.

The facts in the matter are quite different. When Daniels placed the order for those fever thermometers he bought a dozen. The merchandise had come in that very morning and the transaction which Daniels happened to see was the first of the dozen to be sold.

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* Lecturer on Business, Columbia University and Philadelphia College of Pharmacy and Science.

Now trace actually, not theoretically, what happens to the $1.50 which was received in cash for this thermometer. It goes, of course, into the cash register, later in the day to the office and, eventually, into Martin Daniels' none too healthy bank account. Does this $1.50 stay there to increase Martin Daniels' bank account permanently?

Far from it. Back on Daniels' desk, awaiting his official O. K. is an invoice which reads:

"1 doz. E-D-E fever thermometers in pocket case, No. 3590¼ $10.80"

It is perfectly obvious that the only place from which the money can come to pay this bill is from the receipts from sales. This first $1.50 and another and another, until eight such sales have been made, go right out again to pay for this merchandise.

Where's the mythical 22½-cent profit that he received? Daniels has to make eight sales before he has taken in enough money to pay for the merchandise. Of course, if the unexpected happens—and it has an unpleasant habit of so doing—Daniels may not sell even eight of the dozen.

He then has to dip down into his none too capacious bank account to pay the bill. He may be able to put off paying the bill for awhile but, eventually, it can't be avoided and then he has to hand out the cash. Whether or not he is ever able to restore this money to his bank account depends, of course, upon his selling more of these fever thermometers.

But the cost of the merchandise is only one of the costs incident to its sale. There is the cost of selling it and the cost of keeping it in the store ready to sell. As Daniels has explained already, these two additional costs average a total of 25 per cent of the sales.

The situation with respect to this dozen purchase then looks as follows:

When the entire dozen are sold, the receipts will be		$18.00
This merchandise cost	$10.80	
The operating costs of the store average 25 per cent of sales, or	4.50	
Leaving a profit, apparently of		$2.70

Eight of these fever thermometers must be sold before enough money is taken in to pay the cost of the merchandise. Three more must be sold to cover the necessary operating expenses of the store.

What if three more aren't sold? Once again Martin Daniels' long-suffering bank account must bear the burden. Expenses must be paid at once. They can't wait on sales. What will the assistant who made this first sale say if he can't draw his wages before he leaves Saturday? What will the landlord say if the rent isn't forthcoming? What will the light company say if the bill isn't paid on the due date?

It thus becomes apparent that only if and when the last of these dozen thermometers are sold does Martin Daniels receive the 22½-cent profits he expects to make on each of the twelve sales. Everything else takes precedence over Daniels' profits. Cash profits are the last thing to be realized and then they come only if he has been able to sell all of his purchase and then only if all are sold at the full price.

I purposely have made this illustration as conservative as possible. Lots and

lots of purchases are made in greater quantities than single dozens. It is easy to imagine how long a druggist must wait for profits on these quantity purchases if, indeed, he ever receives any profit at all.

I purposely have assumed that all of the purchase could be sold quickly enough for each one to yield the full retail price. However, under these ideal conditions it is apparent that on as small a purchase as a single dozen the druggist has a long, long wait for cash profits. Many times they never come at all because the part of the order on which the profits are locked is still on hand, tucked away in some dark corner.

It isn't unnatural for a druggist to buy a quantity of an item on which the gross margins are liberal as they are in this case. Net profits in a drug store are determined by gross margin, by the volume of business possible to do on the item and the rate of turnover obtainable on it.

It is only natural, therefore, that a druggist will want to stock and feature items on which he can obtain a liberal gross margin, hoping that through his efforts turnover and volume will be obtained.

There is the crux of the whole situation. Unless volume and turnover can be obtained there is no profit. A druggist can't make a profit unless he makes sales. That's the only possible source from which he can make profits. Profits come not from buying merchandise but from selling it. Therefore, the acid test to be applied is not how much does an item cost and what's the gross margin but should include, also, how long a time will be required to sell it.

One other moral is to be drawn from this little story, which is all too true. Ask Martin Daniels if he ever takes an inventory of his merchandise stock and his answer is, "Oh no, I never bother. My stock stays about the same year after year. I do about the same volume of business, increasing a little each year but I don't seem to be getting anywhere."

And the reason Martin Daniels "doesn't seem to be getting anywhere" is the continued accumulation of these unsold odds and ends of purchases which slowly but steadily have increased his stock of merchandise. A regular inventory of his merchandise stock at least once a year by a competent person would have brought these facts to light. It would tell Martin Daniels that his merchandise stock was increasing slowly, steadily; it would tell him that the profits which his business should be earning instead of being returned to him in case were locked up in a growing pile of unsold and, perhaps, unsalable merchandise.

With these facts before him, Martin Daniels wouldn't have wondered long what to do.

But without the facts he is in the unfortunate position outlined in the beginning of this story, "I go on year after year, apparently making a profit, but I don't seem to be getting anywhere."

President John M. Thomas, of Rutger's University, has resigned to become a vice-president of the National Life Insurance Company, of Montpelier, Vt.

Investigations are being made of the effect on the individual of wood alcohol when used as an anti-freeze mixture for automobile radiators. The question is whether the fumes can get into the body by absorption through the skin, or by inhalation, and produce the poisonous effects of methanol.

THE DEPARTMENT OF THE NATIONAL ASSOCIATION OF BOARDS OF PHARMACY

President, W. M. Hankins, Daytona, Fla. J. W. Gayle, *Treasurer*, Frankfort, Ky. Chairman of Executive Committee, A. C. Taylor, Washington, D. C. *Secretary*, H. C. Christensen, 130 N. Wells St., Chicago, Ill.

ACTIVE MEMBER STATES.

Alabama	Indiana	Montana	Rhode Island
Alaska	Iowa	Nebraska	South Carolina
Arizona	Kansas	Nevada	South Dakota
Arkansas	Kentucky	New Hampshire	Tennessee
Colorado	Louisiana	New Jersey	Texas
Connecticut	Maine	New Mexico	Utah
Delaware	Maryland	North Carolina	Vermont
D. of Columbia	Massachusetts	North Dakota	Virginia
Florida	Michigan	Ohio	Washington
Georgia	Minnesota	Oklahoma	West Virginia
Idaho	Mississippi	Oregon	Wisconsin
Illinois	Missouri	Pennsylvania	Wyoming
		Porto Rico	

TIMELY SUGGESTIONS FOR LEGISLATION.

BY H. C. CHRISTENSEN, SECRETARY.

Legislatures will meet in some forty odd states the coming winter and spring. Already, many inquiries are being received by the N. A. B. P. office for advice and help relating to legislative matters. It seems, therefore, an appropriate time to consider legislative programs. Uniformity in certain fundamentals in pharmacy laws is important to avoid antagonism with neighboring states. Also, there is no sense in enacting meaningless technicalities which will deny the pharmacists of the state reciprocity elsewhere in later years. The legislative committees, state associations, board members, college faculties—in fact everyone interested in a legislative campaign—owe it to the pharmacists of that particular state to check on these fundamentals and particularly to determine that his reciprocal privilege has not been curtailed.

WARNINGS.

Sometimes a legislative committee has the feeling that if it picks the best provisions from the laws of a considerable number of states, the result will be a perfect law. Entirely the reverse usually happens, as all laws should be planned in such a manner as to make each section complete in itself, yet a coherent part of the whole. This can seldom be accomplished when separate provisions from different laws, often with little or no relation to each other, make up the whole.

Do not ask for too much. It is practically impossible to present an entirely new pharmacy law and have it enacted without many changes by the legislature. In the end, it may be worse than the law you now have. Therefore, decide on one, or at the most two, important changes that are necessary or desirable and concentrate on these. Each change or provision should be presented as a separate amendment, thus taking advantage of the fact that if one is defeated, the other

may be enacted. The difficulty in passing a whole new law is that opposition develops to various sections or provisions, and the combined opposition defeats the entire bill.

Do not introduce drastic commercial measures—limiting the sale of household remedies, patents, proprietaries, etc.—at a time when more important and fundamental provisions are being asked for. Such measures usually are doomed to failure, and quite likely would also bring about the defeat of the more important provisions. Such types of provisions have been declared unconstitutional in certain states in the past and therefore, if attempted, should be introduced as a separate section or amendment at a time when no other important measures are pending.

It is most important to remember that no legislature is particularly interested in passing laws designed to help your business interests as a pharmacist. It *is* interested, however, in the protection of the public welfare, and bills drafted with that object in view are usually given favorable attention. Quoting the assistant attorney general for Maryland, the Hon. Herbert Levy, on this point:

> "When courts and juries and justices of the peace realize that what you are trying to do is to preserve the public health and safety and not subserve some selfish purpose, they are inclined to act in accordance with the spirit rather than the letter of the law and technicalities are often brushed aside. But this is only true if it appears that your action is necessary to eliminate a menace to public health and is not intended to harness or unduly interfere with the exercise of private rights."

Do not attempt to be too specific in details. It is impossible to think of all the details. When detail is attempted everything must be enumerated, otherwise the law is weakened. Also, as conditions change, there is necessity for change in details, and amending laws is difficult work. A law drafted along general lines covering fundamentals, with the minor details to be worked out by the board of pharmacy in its by-laws and rules is far more practical and forceful. As an example of useless detail: Some laws specify the Pharmacopœia to be in effect, U. S. P. X. Such a law must be amended every ten years, and often the succeeding revision of the U. S. P. is in effect for a year or two before the legislature gets around to making the change. In the meantime, the state board, technically speaking, must recognize the U. S. P. IX, for example, while the national standard is the U. S. P. X. Simply stating "latest revision of the U. S. P." is sufficient.

Attorney Levy said at the recent convention:

> "If some things slip by from time to time which the law is not adequate to prevent, don't rush to the legislature and ask for additional legislation, because you will find that the more laws you have on the books, the greater the number of things that slip by."

FOR STATES WITHOUT THE COLLEGE PREREQUISITE.

The best possible legislative program for such a state is to concentrate on one thing—the amendment of the section providing the requirements for admission to examination. Thirty-six state laws now provide for college prerequisite, and it is extremely important that the remaining states enact prerequisite laws at the earliest possible date in order to entitle their registrants to general reciprocity. No other measures should even be considered at the same session.

The registration and reciprocity section must harmonize with similar provisions in other states, in order that the reciprocal privilege of the pharmacists of the state will be protected. Therefore, it should be drafted with great care and submitted to the N. A. B. P. for review and suggestion before being submitted to the legislature. Often the change of a word or two is very important.

The number of years of college attendance should not be specified; "graduation from a college of pharmacy recognized by the board" will suffice. This will take care of the three-year graduates until 1936, and after that the four-year graduates, without further amendment.

It has been reported that two or three states are contemplating prerequisite laws limiting the college course to two or three years. Such action would be a serious mistake, as the four-year course becomes effective for matriculation in 1932 and member boards are expected to enforce this ruling. Those boards that continue to recognize and examine graduates of the two- or three-year courses will find themselves in the same position as far as reciprocity is concerned, as if no college requirement were in effect in these states. Not only will their registrants be barred reciprocally, but they will be unable to qualify for examination in prerequisite states that require the four-year course. Such pharmacists will be obliged to practice for the balance of their lives in the state of examination or other non-prerequisite states. Not only the boards of pharmacy, but also the colleges in these states should give serious consideration to this before enacting any new laws. The N. A. B. P. is at present having considerable difficulty because of two-year course graduates who matriculated in 1925 in non-A. A. C. P. schools, and while some of these institutions have since been brought up to the standard for recognition, these two-year graduates are barred and they naturally do not now thank their college for giving them a two- instead of a three-year course, nor the board for examining them on these credentials.

AMENDING ENTRANCE REQUIREMENTS FOR FOUR-YEAR COURSE IN GRADUATE STATES.

Those states which are now on a college graduation basis may find some amendment of their laws necessary to provide for the four-year course. While the four-year course becomes effective for matriculation in 1932, the boards will not examine the first graduating class thereunder until June 1936. On account of crowded legislative programs, however, amendments should be introduced at the coming session. While we still have '32 and '34 sessions, those familiar with work of this kind know that it sometimes takes two or three attempts to get a law amended. An early start is advisable.

Types of amendments necessary:

(*a*) Laws of states at present on a four-year training basis, which specify that not to exceed two years credit shall be given for college graduation. Illinois is an example of this. Here the only change necessary is to make the word "two" read "three" years credit, thus automatically cutting the experience requirement to one year, the agreed minimum.

(*b*) Other state laws specify that a minimum of two or three years of experience shall be required in addition to graduation. In such states, the laws ought to be amended to require only *one* year of experience with the four-year course.

(*c*) Still another classification is that of certain states which permit giving a full calendar year of credit for a term in college. In such instances, no experience would be required with the four-year course under the present law. Ohio and Washington are examples. These laws should be amended to require one year of experience in addition to graduation, otherwise registrants will be barred for reciprocity because of insufficient prior experience.

Certain states which are now on a four-year training basis, where the law specifies that the Board shall give credit for actual time of college attendance but specifying no maximum or minimum credit, will not require any amendment. In such cases, however, the Board should rule that the credit for the college term shall be nine months, totaling 36 months for the four years of college, thus automatically requiring a minimum of one year of retail experience.

DRUG STORE DESIGNATION AND REGISTRATION ACTS.

States that have no legislative program as outlined and would like to improve the pharmacy law can do no better than to pass one of the "drug store designation and registration acts" where the same are not already in force. These provide that only a duly licensed pharmacy, registered with the Board for a fee, having a registered pharmacist in charge, is permitted to display signs, "pharmacy, drugs," or the equivalent. One big advantage of such a law is that it provides the Board with the proper statistical data as to the number of pharmacists in the state, and who is in charge of each pharmacy. Those not on the list are violators and can be fined. From an enforcement standpoint, this type of law has been found very beneficial in a considerable number of states.

The National Association Boards of Pharmacy, 130 N. Wells St. invites you to mail copies of your proposed legislative drafts for checking and suggestions. Assistance will also be given in drafting amendments, laws, etc., if desired. There is no charge for this service, as the constitution of the association cites as one of its objects "the fostering of a uniform minimum standard of pharmaceutic education and uniform legislation."

OBITUARIES.

A. E. CARLSON—NEBRASKA—SEPTEMBER 3RD, 1930.

Word reaches us of the sudden death of A. E. Carlson of Dannebrog, Nebraska, on September 3rd. He was an active member of the Nebraska Pharmacy Examining Board and an ex-president of the Nebraska Pharmaceutical Association. The National Association of Boards of Pharmacy particularly mourns his loss, as he showed a keen interest in the work of the Association although a comparatively new member.

RALPH C. ROOT—VERMONT—AUGUST 3RD, 1930.

Ralph C. Root, member and former president of the Vermont Board of Pharmacy, died on August 3rd following a heart attack, at the age of thirty-four years. He had only recently married, as an item was noted about his returning from his honeymoon in Washington, D. C. in time for the June Board examinations. He

was born in Brattleboro and resided there during his life. He had been a member of the Vermont Board of pharmacy for more than ten years, and was a graduate of the Massachusetts College of Pharmacy, with honors, in 1916.

His father, Wilfred F. Root, also served on the Vermont Board from 1902 to 1917, and a most interesting autobiography of his life is on file in the N. A. B. P. archives. The father was first president of the New England Association of Boards of Pharmacy, a predecessor of the N. A. B. P., having reciprocity as its object.

It is lamented that the son passed away at such an early age; he had accomplished much and the future held promise of a great deal more.

PERSONAL.

Dr. Robert P. Fischelis, secretary and chief chemist of the New Jersey Board of Pharmacy, has been appointed to the research staff of the Committee on the Cost of Medical Care, which is headed by R. L. Wilbur, secretary of the interior in President Hoover's cabinet. Dr. Fischelis, together with Dr. C. Rufus Rorem, an expert economist and scientific accountant, is to make a study of the Service of Pharmacy as it pertains to medical care.

STATE BOARD NEWS.

Alabama.—An examination was held at Montgomery, Tuesday, October 21st, results of which will be announced later.

J. T. Dumas, president of the Alabama Board, was elected third vice-president of the N. A. R. D. at the Atlantic City convention. Secretary Bingham writes that Alabama appreciates this honor.

Reciprocal registration was recently granted to: Noel G. Andrews and Frank Pittman Wood, of Georgia; Fred Frisch, of Louisiana; Herman E. Cox, of Mississippi; Henry S. Spires, of South Carolina.

Arizona.—At the recent meeting of the Arizona Pharmaceutical Association held in Prescott on September 2nd–3rd, Arthur Lee Phelps, secretary of the board of pharmacy, was elected secretary of the state association.

Dr. J. A. Dines resigned from the Board on September 13th, due to ill health. He is 86 years of age, and he was first appointed in 1903 and has served continuously since, with the exception of two years. He was president of the Board at the time of his resignation.

Governor John C. Phillips appointed Carroll M. Wood of Glendale to fill Mr. Dines' unexpired term. Mr. Wood has been in Arizona since 1918 and has been prominent in the work of the state association, being a member of the Executive Committee. He owns pharmacies in Glendale, Peoria and Wickenburg.

Kansas.—Forty applicants were examined at the meeting held in Pratt on August 7th–8th, and thirteen succeeded in making the required grades.

After the examinations were finished, the members of the Board were the guests of Joe Demain, an ex-member, at the famous Cook Hotel, Macksville—everybody reported a good time.

Kentucky.—The report of the July 8th examination shows that 19 out of 35 applicants for R. Ph. license passed; 3 out of 10 trying for the assistant certificate also passed. Andrew L. Burke of Georgia and Miss Virginia C. Brown of Ohio qualified by reciprocity.

After full consideration, the Board decided that hereafter the practice of registering applicants for registered pharmacists who attain a general average of 60% as assistant pharmacists will be discontinued from date of meeting.

Another examination was held at Mayfield on October 14th, but the results were not available at the time of going to press.

Mississippi.—J. S. Puller, of Starkville, was elected president of the Mississippi Board. He has served on the Board under three governors.

Stonewall J. Alston, of Arizona, was recently registered by reciprocity.

Missouri.—H. W. Reuter was re-appointed as a member of the Missouri Board of Pharmacy on August 1st, for a third term. He was first appointed in 1921 and is now serving his eighth consecutive term as president of the Board.

Reciprocal licenses have been issued to the following: Gail E. Overstake, of Nebraska; Joseph M. Ellett, of Indiana; Lawrence R. Dry, of Illinois; Horatio S. Stokes, of Tennessee.

Nebraska.—Mrs. Clark Perkins, director of the Bureau of Examining Boards, announces that the State Pharmacy Board will hold an examination November 5th, 6th, 7th and 8th, at the college of pharmacy in Lincoln, Neb.

Wm. A. Klingberg, of Kansas, was recently registered by reciprocity.

New Mexico.—A regular business meeting and examination was held at the Franciscan Hotel, Albuquerque on October 20th and 21st. Results will be announced later.

J. Q. Warnick, of Arizona and J. D. Shropshire, of Texas, were registered by reciprocity in September.

North Carolina.—Secretary F. W. Hancock writes: "It was a great pleasure to our Board to have Secretary Christensen, who is now the President of the AMERICAN PHARMACEUTICAL ASSOCIATION, meet with us in Raleigh, August 11 and 12, 1930."

The next meeting of the Board will be held at Chapel Hill, November 18th and 19th.

Reciprocal registration was granted to the following during September: Mrs. M. J. Chapman, of Oklahoma; Emmett O. Chandler, of Virginia; Oren R. Judy, of South Carolina.

North Dakota.—Meetings of the North Dakota Board will be held at the School of Pharmacy, Fargo, on November 11th, 12th and 13th, to examine candidates and transact any other business to come before it. Applications and communications should be addressed to P. H. Costello, secretary, Cooperstown, N. D.

Peter Zappas, Jamestown and Minot confectioner, was arraigned in court September 8th, charged with illegal sale of aspirin. He admits the charge but contends the Board has no right to restrict the sale of aspirin under the North Dakota statutes. He was bound over to the district court for trial in December.

Oklahoma.—The Oklahoma secretary, C. M. Anderson, is swamped with work, on account of the annual renewal of both pharmacists' licenses and drug store permits. The secretary estimates that there are 2300 pharmacists in the state and approximately 1100 drug stores.

South Dakota.—Fred L. Vilas, president of the Board has been advised by the attorney general of that state that corporations may own and operate drug stores in South Dakota, so long as they employ competent registered pharmacists to operate the stores.

Under the South Dakota law, it is unlawful for any person other than a registered pharmacist "to open or conduct any pharmacy or drug store." The attorney general ruled, however, that "where the owner of a drug store takes no part in conducting such business but employs a duly registered pharmacist, he has complied with the pharmacy law. It therefore follows, that a corporation may be the owner of a pharmacy or pharmacies in this state and the corporation may comply with the law if it employs a duly registered pharmacist to manage each store owned by the corporation in this state."

Tennessee.—Samuel Bradshaw, of Nashville and J. H. White, of Jackson, were recently appointed members of the Tennessee Board of Pharmacy by Governor Horton, the former to succeed Samuel C. Davis, of Nashville and H. M. Oliver, of Union City. Both were ineligible for reappointment on account of having served the maximum of five years.

Texas.—Walt Cousins, secretary, writes in his characteristic style: "The Texas Board of Pharmacy held an examination in Amarillo, September 9th, 10th, 11th, with 152 applicants. Grading of papers not finished at this writing. Among the applicants was Dr. Ishmael Vela Vasquez, of 'Pharmaceutico del Aguila' (Eagle Pharmacy), Hebbronville, Texas. Dr. Vasquez is a graduate of the University of Mexico at Mexico City. The doctor speaks fluently Spanish, German and French, but could 'no sabe' English. His papers will be graded by Frank A. Walter, of San Antonio, who is thoroughly conversant with the Spanish language.

"James Doan was applicant at the examination and comes from Mercedes, Texas, which

is a little over one thousand miles from Amarillo as the crow flies. Mr. Doan made the trip in his automobile in 26 hours."

The following reciprocal licenses have been issued recently: Frank E. Webb and Wm. K. Clemons, both of Alabama; Archer McWhorter, of Arkansas; James R. Hart and Lewis T. Davis, of Georgia; Montrey Percifield and Joseph H. Heward, of Indiana; Wm. T. Salyers, of Louisiana; Rolla S. Gratigny, of Missouri; Jerome L. Hankin, of New Jersey; Havas H. Miller and Conrad C. Tull, of New Mexico; Robt. L. Gilbert and J. R. Davis, of Oklahoma; John A. Hans, of Wyoming.

Utah.—Director S. W. Golding, of the Department of Registration, reports that seven pharmacists have been licensed recently and that fines have been imposed in five cases of violation—practicing without a license. The department is functioning "admirably," he reports.

Virginia.—The Board of Pharmacy will conduct examinations in Richmond, on November 11th and 12th, at the Medical College, of Virginia, 12th and Clay Streets.

Wisconsin.—Forty out of 114 candidates in the August examination have been licensed—30 as registered pharmacists and 10 as assistants.

Another examination was held October 20th, but the results were not ready at the time of going to press.

Reciprocal registration was granted in August to the following: E. A. Maercklein and R. L. McMurray, of North Dakota; Lazarus Altfeld, of Indiana; M. Fernan Nunez, of Georgia; Israel Weisman, of Illinois; John E. Sypniewski, of Michigan; Sewall A. Bussell, of Massachusetts.

MEMBERSHIP OF THE JAPANESE PHARMACOPŒIAL COMMISSION.

From the *Weekly Japanese Druggist.*

The following persons are the special, regular and temporary members of the Japanese Pharmacopœial Commission:

(*A*) *Special Members:* Keizo Ikeguchi (Doctor of Pharmacy), *Chairman;* Saburo Takahashi, president of Tokyo Drug Manufacturers' Union; Kotaro Nishizaki, president Tokyo Imperial Hygienic Laboratory; Shuhei Isono, Pharmacist-Rear Admiral; Heisaburo Kondo (Dr.), Tokyo Imperial University; Yasuhiko Asahina (Dr.), Tokyo Imperial University; Kenzo Hattori (Dr.), Tokyo Imperial University; Matajiro Watanabe, Pharmacist-Lieutenant-General; Yoshizumi Tawara (Dr.) ex-president, Tokyo Imperial Hygienic Laboratory.

(*B*) *Regular Members:* Medical men: Kinnosuke Miura, Taichi Katajama, Junjiro Shimazono, Teizo Tsuruta, Chujiro Nishino, Yasukatsu Kurimoto; Physicist, Keita Shibata.

(*C*) *Temporary Members:* Akira Ogata, member of Faculty, Tokyo Imperial University; Isamu Takino, president Osaka Drug Manufacturers' Union; Unji Konno, Engineer, Tokyo Hygienic Laboratory; Tatsuo Kariyone, Engineer, Tokyo Imperial Hygienic Laboratory.

MEDICAL TERMS UNIFIED.

The Resources Bureau's committee on the unification of medical terms has tentatively selected about 1300 words. Opinions relative to names will be gathered by each member of the committee. The physician members of the committee held a meeting in the Home Office on July 14th with the Japan Pharmacopœia Investigation Commission, and was attended by the following members: Chairman Ikeguchi, Takahashi, Watanabe, Nishizaki, Isono, Kondo, Ogata, Karizone, Konno. Dr. Keimatsu was absent and Mr. Marsuo of the Home Office made a detailed report on the work of the committee. The decision on the following was reached by the meeting:

1. Agreement on more than 20 names was made but no agreement was reached on magnesium.
2. To unify the kana[1] for foreign words.
3. Medical terms. There were some 1300 terms on which the agreement was reached, but not citric acid.

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[1] The Editor understands that Kana is made up of borrowed Chinese characters, used chiefly for proper names and foreign words.

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

For years we have had a fairly definite procedure for qualitative and quantitative analysis of inorganic compounds. Within the past decade attention has been given to the qualitative and quantitative analysis of organic compounds and steps are being made toward the development of procedures for similar analyses of organic compounds. The following paper by Dr. George D. Beal, of Mellon Institute of Industrial Research, is of special interest because the author is a leader in the field and he discusses the important subject of background necessary for the development of quantitative organic analysis.—C. B. JORDAN, *Editor*.

WHAT CONSTITUTES A PROPER FOUNDATION FOR THE STUDY OF QUANTITATIVE ORGANIC ANALYSIS.*

BY GEORGE D. BEAL.**, ***

When accepting the invitation to contribute this paper, it was the writer's intention to discuss, in a very general way, the prerequisites for the most effective teaching of organic analysis, or rather pharmaceutical assaying. The subject was therefore fixed as has been announced. Deeper reflection made evident the folly of attempting to review a curriculum in chemistry in a few pages. The paper will accordingly be limited to a discussion of one most essential prerequisite, a comprehensive course covering the fundamentals of quantitative analysis.

Thorough preparation in general chemistry and qualitative analysis is assumed, and also proper training in organic chemistry to accompany or follow the course that we are outlining here. To those who will object that what we are proposing herein is a part of the training of a chemist and not of a pharmacist, we make our reply at this point. Organic analysis, pharmaceutical assaying and clinical analysis are chemical subjects of an applied character. While the practice of these is becoming more empirical, and the list of arbitrary procedures to be followed by the laboratory technician is multiplying, the interpretation of data requires sound fundamental training, with a correct understanding of contributory factors.

Every teacher of analytical chemistry is disturbed, sooner or later, by the pleas of his students to be given practical work. The agricultural student wishes to plunge immediately into the analysis of soils and fertilizers, the budding chemist is anxious to get at coal or stainless steel and the pharmaceutical apprentice doubtless longs to begin upon the assay processes of the United States Pharmacopœia. Teachers generally agree that a proper training in the fundamental principles of quantitative analysis is essential for the student who proposes to master its technical applications and to interpret properly the data so obtained. What shall constitute this fundamental training?

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* Presented to the Chemistry Teachers Conference, 31st Annual Meeting American Association of Colleges of Pharmacy, Baltimore, Maryland, May 5, 1930.

** Assistant Director, Mellon Institute of Industrial Research, Pittsburgh, Pennsylvania.

*** The author wishes to acknowledge his indebtedness to two of his former colleagues at the University of Illinois. The program was largely suggested by Dr. George McPhail Smith, now of the University of Washington, and much of the planning of samples was done by Dr. S. A. Braley, now of Mellon Institute.

Outline of the Laboratory Course.—The teaching of elementary quantitative analysis has two purposes. The first of these is to emphasize the quantitative character of chemical reactions. The second is to develop on the part of the student a technique that in addition to teaching specific procedures emphasizes exactness of operation. In the selection of laboratory experiments, the final application of these principles is made possible by adopting for teaching purposes those experiments that involve typical reactions and operations. Thus, tradition has it that in the list of gravimetric determinations shall be those of a halide ion, a sulphate ion, a trivalent metallic ion and one of the ions of the alkaline earth series.

The gravimetric determination of the halide is the basic method for the determination of chlorine, bromine, iodine and silver, the first three not only as halide ions but also after reduction from any other valency. The selection of the precipitating reagent illustrates the physico-chemical principles of ionization, solubility and solubility product. The preparation and handling of the solution involves the maintenance of acid reaction to prevent the precipitation of other ions. The colloidal character of the precipitate as first formed requires that it be coagulated by heat and electrolytes at the proper degree of acidity. Washing of the precipitate not only repeats the opportunity for the discussion of colloidal solutions and solubility product, but in the treatment of effective washing with a minimum of liquid suggests what will be taken up in the theory of extraction by immiscible solvents as the coefficient of distribution. Finally, if the precipitate is to be ignited, reduction by burning paper, reconversion by acids and volatility of salts must be discussed. In fact, if one were willing to spend the time upon it, and the temperament of the student would permit, the greater part of the theory of gravimetric analysis could be presented and demonstrated by means of a detailed study of this determination.

In the same way the analysis of a sulphate is not only a type determination but brings in as well the determination of all other forms of sulphur and suggests the determination of any acidic element in organic material. But since the points applicable to several specific determinations are the ones which warrant most emphasis in an elementary course, the determination of sulphate offers two of exceptional importance from the teaching standpoint. The first is the explanation of the contamination of precipitates by occlusion and double salt formation, while the second is the production of filterable precipitates of crystalline materials by crystal growth or digestion. Another reaction worthy of discussion at this time is the dissociation, by heat, of salts of relatively non-volatile bases with more volatile acids. Following this determination with that of iron or aluminum, the theories of hydrolysis and amphoteric reactions are introduced, with a reëmphasis, in certain cases, of the need for control of the state of oxidation. These, of course, represent only one series of determinations that may be used in the introduction to quantitative analysis.

Volumetric Analysis.—Opinions differ as to the proper place in the course for the introduction of volumetric analysis. The place assigned by tradition is following the gravimetric part. Some cases have come to our attention where it follows as a separate course. Some textbook authors treat it in a separate volume. On the other hand, some of our greatest teachers have used volumetric analysis as the introduction to the subject of analytical chemistry.

For my part, I have followed tradition, in devoting the second half of the semester to the subject, and have followed the new thought movement by placing it at the beginning. My real preference, followed for the last few years of my teaching experience, is for an introductory period for gravimetric analysis, then the treatment of volumetric analysis and last of all, combination analyses, involving both procedures, or more elaborate gravimetric analyses involving quantitative separations, double precipitations, etc. We really seem to have had the best results from this arrangement, and the reactions of the students have been exactly those that we looked for in outlining the program.

To begin with, all of quantitative analysis, aside from a very few empirical analyses such as the fire assay of ores, is based upon the theories of definite proportions and of combining weights. It requires less stretching of the students' imagination to calculate the percentage of chlorine in silver chloride, from that the weight in a precipitate of silver chloride and in turn the weight and percentage in an impure sodium chloride than it does to calculate the strength of an acetic acid solution from a volume of standard alkali; the normality factor of the same alkali and the weight of a hydrogen equivalent, or gram equivalent, of acetic acid. Precision in weighing is easier to develop than precision in measuring. Filtration is an operation which, while requiring great care to avoid loss, does not involve the regulation of volumes to a single drop. The student acquires a certain facility in the handling of laboratory apparatus before he begins titration and exact pipette measurements. Attention is also called to the progress of chemical reactions by rates of precipitation and coagulation and settling of precipitates.

Thoroughly understanding the law of definite proportions and the direct relations between samples and precipitates, the student is more ready to grasp the theory of normal solutions as based upon hydrogen equivalents, the gram equivalent system. From his gravimetric determination of chlorine he learns that since the weight of silver chloride is proportional to the sodium chloride in his sample in the ratio of their molecular weights, the silver nitrate required to form the precipitate must be likewise proportional. This suggests that if the concentration of the silver nitrate be known, and if the addition be stopped just at the end of precipitation, the volume of silver nitrate used will be a measure of the sodium chloride originally present. Having previously learned from the law of mass action that a very slight excess of precipitant is required for complete precipitation except when double salts are formed, and knowing that chromate ion will give a color with silver ion in solution, the thought of an end-point indicator as a convenience is suggested. And we now have the thought of volumetric analysis by standard solutions and colored indicators ready for elaboration into procedures based upon normal solutions, grams equivalent and indicators changing their color at certain hydrogen-ion concentrations.

Oxidation and reduction reactions naturally follow neutralization titrations, for the oxidizing power of solutions is measured by their ability to form water from hydrogen just as much as the power of bases to neutralize acids is measured by their ability to form water. Throughout volumetric analysis, the student should be required to determine the hydrogen equivalents of all solutions, and to standardize all solutions on a basis of normality. The policy of requiring the dilution of all solutions to exact decimals of normality is, in my opinion, a poor one.

The exercise is merely one in dilution, and the calculations thereafter become so mechanical that much of the educational value of volumetric calculations is lost.

It is unwise to attempt the teaching of analytical chemistry without explaining the reactions as far as possible, and yet simply, upon the basis of the modern theories of electrolytic dissociation. Aside from the practical applications now being made of these principles, qualitative and quantitative analysis offer the best means of demonstrating the phenomena due to ionization. Solubility of carbonates in acid with effervescence and the greater solubility of metallic sulphides in nitric than in hydrochloric acid demonstrate the removal of ionization repression. The chloride precipitation is illustrative of the common-ion effect in connection with the solubility product. Precipitation of aluminum by ammonia in the presence of ammonium chloride and the composition of magnesia mixture are other admirable demonstrations of common-ion effect. Again, the phenomenon of hydrolysis as regulated by the ionization of acids and bases in determining the stability of salts is well demonstrated by the hydrolysis of ferric sulphate and ferric acetate. While an elaborate presentation of hydrogen-ion control can be made only in a course in physical chemistry, the behavior of indicators in acidimetry and the buffer action of salts offer a very good demonstration in analytical chemistry.

The teacher has great latitude in the selection of special determinations, but they should always be selected with reference to their educational value, rather than as an instructor's hobby. There is one in particular which should never be omitted, the Kjeldahl method for organic nitrogen. This method with its modifications has many applications in organic analysis, both proximate and ultimate. The limitations of time, laboratory space and equipment and the preliminary preparation of the students impose certain limitations that must be observed in selecting additional experiments. Certainly however, in the field of volumetric analysis, acidimetry and alkalimetry, and oxidation and reduction including permanganate and iodine titrations should be included.

Analyzed Samples.—Proper teaching of quantitative analysis requires a careful preparation of samples. It is, in the writer's opinion, never justifiable to use pure salts as laboratory samples. In the first place, such samples invite dishonesty. Students have a pronounced tendency to compare samples and results, and careful inspection of notebooks is only one of the safeguards to be used. Samples should never be prepared with a view to misleading the students, but diluents, when used, should be those that necessitate certain obvious manipulations when preparing the sample for analysis. The complexity of the sample will also be governed by the amount of time available for each determination.

A suggested series of samples is as follows:

1. Mixtures of sodium or potassium chloride and sodium carbonate. These serve a manifold purpose. They may be used for the gravimetric and volumetric determination of chloride ion and for titration with standard acid and methyl orange as an experiment in alkalimetry. If potassium chloride is used, they are also available for separation of the alkali metals by chloroplatinic or perchloric acids. Such samples are non-hygroscopic under ordinary conditions. By substituting potassium sulphate for part of the sodium carbonate, they may be used for sulfate determinations.

2. Mixtures of ferric sulphate, sodium sulphate and sodium carbonate may be used for the determination of iron, gravimetrically by precipitation as the hydroxide with ignition to oxide, and volumetrically, after solution and reduction, by titration with permanganate and dichromate. They are ideal samples for the determination of the sulphate ion, as the filtrates resulting from a double precipitation of iron, when concentrated to an appropriate volume, are not only ready for sulphate precipitation, but give the student the experience of making a quantitative separation of two ions.

3. Limestone from Marblehead or Kelly's Island, Ohio, or Marblehead, Illinois, is easily soluble in hydrochloric acid, and is an excellent sample for the determination of insoluble matter, calculated as SiO_2, for the R_2O_3 group, and for calcium and magnesium. It is also easy to fortify this with respect to silica, R_2O_3 or magnesium by adding, respectively, silica flour, ferric oxide or magnesium carbonate.

4. For practice in the phosphate determination, Tennessee rock phosphate is an ideal material, and may be diluted with silica.

5. A solid acid is desirable for an experiment in acidimetry, rather than a standardized solution. Mixtures of potassium pyrosulphate and normal sulphate, tartaric acid and sodium tartrate or citric acid and sodium citrate are excellent for this purpose. The organic acids should be free from water of crystallization.

6. If it is desired to use an ore for the determination of iron by permanganate titration, hematite from the Lake Superior fields may be diluted with silica flour.

7. Some teachers like to use a water insoluble sample for practice in iodimetry. For this purpose there is nothing better than stibnite, or native antimony trisulphide, which may likewise be diluted with silica. The writer prefers stibnite to an arsenic compound, as it is necessary in the antimony analysis to add tartaric acid before dilution to prevent hydrolysis. An opportunity is also afforded to discuss the characteristics of metallic oxysalts.

8. As samples for the Kjeldahl determination, blood flour or blood meal is excellent. Wheat flour is a very good diluent for use here.

Preparation of Samples.—As fine grinding and thorough mixing of all samples is imperative, grinding the raw material with the diluent in a ball mill is the recommended procedure. Diluents should have a specific gravity approximating that of the original material in order to eliminate the danger of segregation.[1] Even with these precautions the entire bulk of each sample should be well mixed by rolling before parceling out the students' portions.

Volumetric Standards.—Every teacher is confronted with certain difficulties in the way of supplying appropriate reference materials for use in the evaluation of standard solutions. The standards should be as cheap as possible, must be permanent and require little preliminary preparation, and should not involve a lengthy series of reactions.

One of the most convenient standards for acidimetry is anhydrous sodium carbonate. Fortunately it is easy to obtain. Almost any so-called "C.P." grade will serve. As a matter of fact, one can go to a barrel of soda ash and, by scraping

[1] G. F. Smith, L. V. and E. L. Gard, *Ind. Eng. Chem., Anal. Ed.*, 1 (1929), 228.

away any crust to remove surface contamination, scoop out reagent of a quality sufficient, with drying at 150° C., for the standardization of hydrochloric acid or a carbonate fusion for a silica determination.

Standardization of hydrochloric acid by precipitation of silver chloride is a good experiment to illustrate the use of a filtering crucible. Our experience is, however, that students obtain more reliable and useable values by titration of sodium carbonate.

The use of iron wire for standardization of permanganate and dichromate is well known. Pure iron is probably the best standard for dichromate. For permanganate we have, however, preferred to use sodium oxalate, which is both anhydrous and non-deliquescent.

Arsenous oxide is the logical standard for iodine, which in turn serves to standardize thiosulphate. Its use also affords an opportunity to discuss buffer action. While pure arsenous oxide is easily obtained, it must be carefully dried. It also has the disadvantage that the weight of the gram equivalent is low, so that very small samples must be weighed for the titration. Almost equally satisfactory results can be obtained by using standard permanganate or dichromate to liberate iodine from acidified potassium iodide,[1] titrating the iodine with thiosulphate and the thiosulphate in turn with the iodine solution to be standardized. The explanation of such an indirect method of standardization also has a considerable educational value.

Laboratory Teaching.—In this course the importance of laboratory teaching takes equal rank with class room presentations. Lectures to cover theoretical discussions are necessary. If, however, I had to choose between class room quizzes and laboratory quizzing, I would, except for the purpose of teaching stoichiometry, choose laboratory quizzing of individual students or small groups, at the laboratory desk. There, with everything before the student, incidental reactions may be discussed and demonstrated, errors in manipulation pointed out and various practical applications described. If time is available, and it should be made available, every student should be required to answer a questionnaire on each experiment before his sample or standard reagent is issued. A review of the questionnaire by the laboratory instructor may serve as the basis for the laboratory quiz. While chemical calculations may be reviewed at this time, at least one hour per week should be reserved for discussion, before the entire class, of stoichiometry. An abundance of problems should be ready, in order to have examples to illustrate any particular procedure. Patience in presentation, and insistence upon neatness and accuracy, will secure the maximum of success in teaching analytical chemistry.

The annual meeting of the Society of American Bacteriologists will be held December 29th to 31st at the Massachusetts Institute of Technology, under the presidency of Prof. S. Bayne-Jones; Dr. Barnett Cohen, of Johns Hopkins School of Medicine, is in charge of the program.

The Bouisson-Bertrand Institute, at Montpelier, France, has been authorized by the government to accept an annual subsidy of $10,000 from the Rockefeller Foundation. The money will be spent upon research into the cause and, if possible, promote the cure of Mediterranean fever, also known as Maltese fever.

[1] Popoff and Chambers, *Jour. Amer. Chem. Soc.*, 45 (1923), 1358; Popoff and Whitman, *Ibid.*, 47 (1925), 2259.

THE UNITED STATES NATIONAL MUSEUM PHARMACY COLLECTION —ITS AIMS, PROBLEMS AND ACCOMPLISHMENTS.*

BY CHARLES WHITEBREAD.[1]

The older pharmacists of the United States, and particularly those who have been pestered with never-ceasing requests for the contribution of material, and coöperation in other forms, will need no introduction to the national pharmacy collection of the Division of Medicine, United States National Museum, which they have helped to develop.

It is no secret that every museum must depend to a greater or lesser extent upon the interest manifested by and the assistance received from the devotees of an art, industry or science, which it endeavors to illustrate. Ordinarily the scientific staff of a museum is small, so that even if there are ample funds and other personnel, which is only rarely the case, still great dependence must be placed on outside help.

The pride of any group in its chosen calling can be fairly well gaged by what it does in the way of improvement; by the extent to which it endeavors to portray its accomplishments of the past and present for the benefit of posterity; and the honors which it bestows on its leaders by means of museum and other types of memorials. It seems to me to speak exceptionally well for the pharmacist's pride in his profession when we recall that the oldest building of the United States National Museum proper was completed in 1879, and the original Section of Materia Medica, made up of the pharmacist's stock in trade and consisting largely of material contributed by pharmacists, was established in 1881.

ORIGIN OF NATIONAL PHARMACY COLLECTION.

In 1882 the drug collection which had been exhibited at the Centennial Exposition at Philadelphia in 1876 was transferred to the Museum by the United States Department of Agriculture. For a time the efforts of the Section of Materia Medica were confined almost exclusively to procuring authentic specimens of medicinal materials. Some years later the development of a history of medicine series was suggested, and Dr. James H. Flint, the first curator of the section, took up the new feature of work without delay. During the remainder of his term of service, Dr. Flint spent the greater part of his time perfecting that part of the exhibition series. The magic and psychic medicine exhibits, as well as the cases illustrating the medical practices of the ancient Egyptians, Hebrews, Greeks, Romans and American Indians, were the results of his efforts. In 1898 the more comprehensive name of Division of Medicine was substituted for the "Section of Materia Medica" theretofore used.

After Dr. Flint's retirement, in 1912, considerable time elapsed before much could be done to carry on the work which he had started, due in great part to the fact that congestion of the Museum's single building made further development impossible at that time. Soon after the Natural History Building of the present Museum group was completed the administration of the Division of Medicine

* Section on Historical Pharmacy, Baltimore meeting, 1930. For an illustration, see June JOURNAL A. PH. A., page 647.

[1] Assistant Curator, Division of Medicine, United States National Museum.

was transferred from the Museum's Department of Anthropology to the Department of Arts and Industries. The removal of the natural history collections to the new building relieved the congestion in the older building, and in 1916 the scope of the Division of Medicine's activities was enlarged again, this time to include the history of pharmacy, public health and sanitation.

It will be noted, therefore, that pharmacy has been represented in the national collections from 1881 to the present time. During the intervening years, pharmacists have responded most generously to every request for coöperation in the courteous and patient manner for which the profession as a whole is famous. Unfortunately there have been periods since the inauguration of the collection when the Museum has been so congested that very little could be done in the way of further development of any section. As luck would have it, several exceptionally fine lots of material, and tenders of coöperation, offered during these periods of congestion, by the AMERICAN PHARMACEUTICAL ASSOCIATION, its individual members and others could not be accepted until additional space was available. The result has been that this material which could not be added to the national collection has been distributed elsewhere, forming the nuclei of other pharmacy collections throughout the country, which is not such an unhappy consequence after all when we realize that more pharmacy museums are needed. So it has not been due to any delinquency on the part of the Museum or pharmacists that the national collection is not more pretentious, or has not been developed more rapidly.

AIMS OF THE NATIONAL COLLECTION.

The diffusion of a more general culture, which forms the basis of professional perfection, has the effect that certain provinces of knowledge, which in former times were reserved for the professional man only, are becoming the property of every educated person. This broadening of knowledge does not mean a restriction of science for professional men. On the contrary, they are enabled to follow the progress of science more closely by receiving a more careful training for their profession, and they can obtain better results with the help of a more educated public, when called upon to make a practical use of their professional knowledge and skill. This development of knowledge has taken place in a very marked degree until one ought to be able to say, or to suppose at least at the present time, that every educated person has some knowledge of pharmacy, medicine, hygiene and sanitation. As the first aim of a national museum is the promotion and furtherance of scientific doctrines, one of its chief responsibilities, therefore, is to select from the whole realm of science those matters which demand public attention and which should be known everywhere, and to present them in a manner intelligible to all.

Having been established before the days of pure food and drug legislation, and at a time when the adulteration of imported vegetable drugs was one of the most serious and annoying problems with which the pharmacist had to contend, the original objective of the Section of Materia Medica was to collect and exhibit authentic specimens of official drugs of this kind. The drugs collected were exhibited under a botanical classification of families, genera and species. Specimens of materials, less costly and more readily obtainable, with which drugs were found to be adulterated were also collected and exhibited. The collection aimed to give the general public an easy reference to specimens of official medicines; warn against

the dangers of adulteration; encourage the growth of drug plants in the United States to make our country as independent as possible in this particular; create a higher regard for the profession of pharmacy and its responsibilities; and to play a part in developing the sentiment which was necessary before protective legislation, such as the Pure Food and Drug Act and other necessary laws, could be enacted.

Another primary aim of the national collection was to impart more general knowledge of the immense scope of the profession of pharmacy. It was not sufficient to show a collection of crude vegetable drugs and let the matter rest there. With the passing years an increasing number of ways was found to illustrate many of the various ramifications of this essential and important art and science. The crude vegetable drug collection had shown pharmacy's interest in biology, the science which deals with all kinds of life; botany, the science of plant life; and pharmacognosy, the science of crude drugs. To this nucleus was added, as soon as time and opportunity permitted, a collection of drugs from the animal kingdom; a series of exhibits picturing mineral drugs; and finally a collection of synthetic medicines. The addition of this material was necessary to supplement the original collection; to round out and balance the display; and to further the object of teaching that the profession of pharmacy also included a knowledge of that part of biology which treats of animal life, as well as the science of mineralogy which deals with the inorganic substances of the earth. A collection of this kind required something to show the pharmacist's daily use of the sciences of chemistry and physics. While these two subjects do not lend themselves readily for exhibition purposes, yet it has been possible to illustrate some of the processes and apparatus necessary to convert crude drugs into the various forms into which medicines must be prepared for administration. This then led to the addition of type specimens of these various medicinal forms; a therapeutic classification of a few of them; and material to demonstrate the standardization of medicines, another important function of the profession of pharmacy. A few of the various specialties of the pharmaceutical industry, such as the manufacture of pills and tablets, plasters, capsules, ampuls, etc., are now represented in the collection, until it can be said that this phase of pharmacy is as well illustrated as any industry here.

It seems to be the consensus of opinion now-a-days that a student should be taught the different phases through which the branch of science which he selects as his life work has passed from its origin to its present condition. A pharmacist will have a deeper regard for his profession if he has some knowledge of its evolution, and undoubtedly there will be times during the course of his professional career when it will be as important for him to be as well acquainted with the errors and misleading theories which have prevailed in regard to it, as with the steps by which real progress has been made. So we see more and more colleges giving attention to the historical side of the teaching of science, both by the addition of brief historical courses, and the development of museum collections to be used as a necessary adjunct thereto. An attempt to illustrate the history of pharmacy was not undertaken at the United States National Museum until 1916. Since that time a series of exhibits, entirely separate from the history of medicine, has been installed.

While a national museum must be concerned chiefly with the collection, identification, preservation, installation and description of material for the education and benefit of the general public, still it would not fulfill all of its functions if it did

not aim to be useful as a research and reference center. One of the later additions to the national pharmacy collection is the pharmaceutical library, which consists of both domestic and foreign books and journals pertaining to the subject, and which are consulted freely by those interested in pharmaceutical research.

RESPONSIBILITIES AND PROBLEMS OF DEVELOPMENT.

The specific responsibilities of a museum are to advance learning by the diffusion of knowledge; to stimulate research; to record the stages in the history of man and his work; to serve as an adjunct to schools and colleges; and to impart general and specific information to the public. The national pharmacy collection has been developed for the purposes mentioned.

The problems which have been met and overcome in the development of the pharmacy collection have not differed materially from those which have had to be contended with in the development of other parts of the national collections. When a museum is started, a task is begun which will never be finished, and the chief problem of a museum, particularly a rapidly growing one of a general type, is to keep its building program apace with its development. The United States National Museum has grown very rapidly, and there have been only brief periods in its existence when space has not been at a premium. The pharmacy collection, however, has not suffered any more for the need of additional space than have the other divisions and sections.

There are few historical pharmacy collections in the United States. Every one admits there should be more. Surely pharmacy has had a sufficiently long and honorable history that its record should be fittingly illustrated. There is ample material in the possession of individuals throughout our country to at least appropriately record the history of pharmacy in the United States. The trouble is that the material is scattered about in small lots where it does very little good. In fact, it is not such a difficult task to locate specimens necessary for the development of public collections. The big problem, after you have found them, is to pry them loose from their resting place in the attic or basement where it is not possible for them to serve any good purpose, and to get them into a public collection where they are needed and will be most useful. While material of a historical nature pertaining to pharmacy is needed in the national collection, still it is not so much a question of which particular museum should get the material, as it is that it should be placed in some museum. Exchanges between museums are one of the principal means of mutual development, and as the only object in keeping duplicate historical material is to be in position to give help in the establishmemt of like collections, if the problem of getting the material to some museum can be met, then the matter of exchanging it or diverting it to the place where it is most needed can be attended to by the museum.

The problem of keeping the collection of drugs, chemicals and pharmaceuticals in a good state of preservation so that they will always be truly representative is one which can only be met by making the necessary replacements whenever required. The devising of ways and means of illustrating the art, science and industrial phases of modern pharmacy is new work which will test anyone's ingenuity.

DEVELOPMENTAL ACCOMPLISHMENTS.

As has been stated, up to 1916 the National Museum's pharmaceutical activities were limited to the collection, exhibition and preservation of official drugs, common adulterants, etc., of civilized countries. Since 1916, when it was possible to add the subject of history of pharmacy to the scope of the Division's activities, the work of development has gone forward until at the present time the collection is fairly well-balanced, with the necessary flexibility to allow the required augmentation when circumstances will permit. The collection may be briefly outlined as follows:

General Facts.—Myths of pharmacy; prehistoric pharmacy; pharmacy of the ancient Egyptians and Hebrews; some drugs of the ancient Egyptians and Hebrews; pharmacy of the ancient Greeks and Romans; some drugs of the ancient Greeks and Romans; pharmacy at the beginning of the Christain Era; pharmacy of the Middle Ages; separation of pharmacy and medicine; origin of apothecary shops; early American pharmacy; the first American college of pharmacy.

Evolution of Pharmacopœias and Formularies.—Comparisons of photographic sections of one of the earliest books on pharmacy and medicine, the Papyrus Ebers, 1550 B. C., with forerunners of the first U. S. Pharmacopœia, and the first and subsequent editions of the U. S. Pharmacopœia, National Formulary, various dispensatories, etc.

History of Pharmaceutical Apparatus and Utensils.—Scales; balances; weights; mortars; pestles; suppository molds; tablet machines; pill machines; stills; patent models; etc.

Illustration of Pharmaceutical Processes.—Distillation; evaporation; sublimation; filtration; dialysis; sterilization; precipitation; maceration; grinding; sifting; percolation; testing; etc.

History of Drugs.—Specimens, drawings, illustrations and historical sketches of drugs used in all parts of the world, such as: Aconite, belladonna, hyoscyamus, stramonium, opium, rhubarb, strophanthus, nux vomica, etc.

America's contribution to materia medica in the form of specimens, illustrations and historical sketches of such drugs as: Cinchona, ipecac, coca, jalap, vanilla, sarsaparilla, etc.

Indigenous drugs of the United States, such as: Sassafras, witchhazel, hydrastis, mandrake, scullcap, sanguinaria, lobelia, etc.

History of Galenicals.—A unit of the collection designed to show the origin and history of some of the most commonly used official medicinal preparations to which the names of the originators still cling, such as: Vinegar of squill, by Pythagorus, 500 B. C.; Diachylon plaster, by Menekrates, 40 A. D.; cold cream, by Galen, 150 A. D.; etc., up to the present time.

A record of the years when medicines were made and sold by letters-patent, and specimens of some of the oldest patent medicines still in use, such as: Haarlem oil, 1672; Hooper's pills, 1743, etc.

Modern Pharmacy.—Crude vegetable drugs; common adulterants; crude animal drugs; crude mineral drugs; serums; vaccines; antivenin; etc.

Specimens of the typical forms into which crude drugs are prepared for administration; pharmaceuticals of all kinds.

Outline classification of medicines by therapeutic effect, with type specimens of the various classes, such as: anodynes, narcotics, sedatives, etc.

Progressive steps in the manufacture of pills and tablets, capsules, plasters, vaccines, serums, surgical dressings, etc.

Pharmaceutical Library.—A large collection of books, periodicals and journals—both domestic and foreign—of particular interest to those engaged in pharmaceutical research.

CONCLUSION.

The national pharmacy collection is in the Arts and Industries Building of the United States National Museum. Nearly two million visitors passed through the Museum buildings last year. Surely one is justified in predicting an increasing usefulness of this pharmacy collection for the instruction of intelligent laymen who

desire to know the part which pharmacy has taken and is taking in the conquest of disease. The formation of the national collection has been essentially a matter of teamwork between pharmacists and the Museum. What has been done here should be done elsewhere, until there are more and better pharmacy collections distributed throughout the United States.

A NOTE ON AN ANCIENT POISONOUS PLANT OF ASIA MINOR.*

BY L. E. WARREN.[1]

Plutarch relates[2] that when Antony was retreating from his fruitless invasion of Media his soldiers were threatened with famine. They were constantly harassed by the Parthians in superior numbers, so that they could not make extended foraging expeditions. In part the account reads:

> "And when they tried vegetables and roots, they found such as are commonly eaten very scarce, so that they were constrained to venture upon any they could get, and, among others, they chanced upon an herb that was mortal, first taking away all sense and understanding. He that had eaten of it remembered nothing in the world, and employed himself only in moving great stones from one place to another, which he did with as much earnestness and industry as if it had been a business of the greatest consequence. Through all the camp there was nothing to be seen but men grubbing upon the ground at stones, which they carried from place to place. But in the end they threw up bile and died, as wine, moreover, which was the one antidote failed."

Not being familiar with any plant having such peculiar pharmacologic properties as those described by the historian and being curious to know its identity, I consulted several works on poisonous plants. I assumed that Plutarch's description was accurate and that the plant must long since have been identified or, at least, conjectures as to its identity must have been made by students in toxicology. So far as the literature on poisonous plants was available I found no reference whatever to the plant mentioned by Plutarch.

In the hope of obtaining some enlightenment on the subject I brought the matter to the attention of several well-known authorities on vegetable drugs and poisonous plants, particularly to those that had made a study of ancient drugs. None of these were able to offer more than conjectures on the problem. One suggested that the plant might have been cannabis; others henbane; I wondered whether it might not have been one of the mandragoras. However, a comparison of the symptoms known to be caused by these several named poisons with the illness recorded by Plutarch shows clearly that none of them can have been the plant under discussion. Two theories are possible to account for the failure of moderns to identify the Medean plant—(1) the plant may have become extinct since Roman times; (2) the symptoms may not have been described completely or accurately by Plutarch. Having no more than a passing interest in subjects of this nature I leave the matter to the Historical Section for further study if it be deemed worth while.

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* Section on Historical Pharmacy, A. PH. A., Baltimore meeting, 1930.

[1] Food, Drug and Insecticide Administration, Washington, D. C.

[2] Plutarch: "Life of Antony."

It is rather curious to note the amount of attention that has been given by modern scientific writers to Xenophon's account[1] of the poisoning of the retreating Greeks by eating poisonous honey, while no one apparently has paid any attention to Plutarch's story. The omission in the latter case is all the more remarkable because the loss of life in Antony's army was considerable while none of the Greeks in the army of Cyrus succumbed.

FLUECKIGERIANA.

BY EDWARD KREMERS.

V. Flueckiger letters to Power.*

Strassburg, 25th March, 1884.

MY DEAR FRIEND:

The translation (1) as mentioned in yours of the 8th inst., came duly to hand and gave me great satisfaction indeed. The translator as well as the publishers (2) may accept my best thanks. I have a little perused your work to-day and think you have pretty well succeeded. And the paper and types and binding are so very much superior to the original; I am sorry to think, that the publishers may perhaps not meet with the commercial success they are so greatly meriting. And as to yourself, let me hope that your labour will be duly appreciated in the pharmaceutical world, both in America and England (3).

I am happy to learn that you are greatly satisfied with your new position (4); your own new home (5) certainly contributes very much to your comfort. I always think, after all, that if one succeeds well in the family life and a little in science that is the best what can be expected on the earth. So I am happy, although things, as you know, at Strassburg are far from answering to my wishes (6).

Dr. Meyer (7) is still with me; he has published a good number of excellent papers (8)—yet without any real progress as to his position. There is no chair vacant which would suit him, so he must patiently wait and wait (9).

I am about to leave (10) for the Mediterranean shores, to pay a visit of 2–3 weeks to Mr. Thomas Hanbury (11), the brother of my late friend Daniel Hanbury (12). The former is the owner of a splendid villa, where I shall be, with my wife, very much delighted with the southern sun and brilliant vegetation.

With kindest regards to you and Mrs. Power (in which my wife cordially unites), I remain

Yours very truly,

F. A. FLUECKIGER.

The above letter was accompanied by a memorandum of corrections:

Corrigenda
in the "Cinchona Barks"

Page 11. Footnote: read how very little improbable.

Page 53. Line 4/5 from bottom read Koerner for Kerner (the former is the chemist of the manufactory of Milan, the latter of that of Frankfurt; the former is the only intended in this place).

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(1) That of "The Cinchona Barks."
(2) The English translation was published by P. Blakiston, Son & Co., in 1884.
(3) Reviews of the book will be found in the following journals: *Am. J. Pharm.*, 56, 300. (Presumably by J. M. Maisch.) *Pharm. Rundschau*, 2, 94 (Fr. H.).
(4) Dr. Power had accepted the Professorship of Pharmacy and Materia Medica at Wisconsin in the summer of 1883, after the Department of Pharmacy had been established by act of the Legislature earlier in the same year.
(5) Having come to Madison in August 1883, Dr. Power was married to Miss Louise Meigs of New York State. Hence Professor Flueckiger's reference to "your own new home."

[1] Anabasis, Bk. 4, C8, 20. L. F. Kebler: "Poisonous Honey." PROC. A. PH. A, 44 (1896), 167.

* Continued from page 882.

(6) That Professor Flueckiger did not find professional life too rosy at Strassburg becomes apparent from other letters. The Kaiser-Wilhelms Universitaet was established in 1872 as a "Reichs Universitaet" not as a Prussian or other state university because Elsass-Lothringen were "Reichsland." Not only did Germany expect much from this "Staette deutscher Cultur" in the provinces that had been alienated more or less by long French rule, but every effort was made to attract students to the university. So far as pharmacy was concerned, these expectations were not fulfilled in spite of Professor Flueckiger's reputation, which was an international one. Whether it was the fact that his career had not been that of the regular German academician, whether it was due to his being Swiss, though "Deutsch-Schweizer," or whether it was due to the suspicion with which pharmacy was regarded at practically all German universities, it might be difficult to decide.

(7) This, the successor to Power as Flueckiger's assistant, was Dr. Arthur Meyer, later known as author of the "Wissenschaftliche Drogenkunde fuer Apotheker," published in 1891. Born March 17, 1850, in Langensalza, he studied in Leipzig and Strassburg, at which latter place, having received his doctorate in 1887, he accepted an assistantship at the Pharmaceutical Institute, which position he held until 1885. In that year he became docent at Goettingen and in 1886 Professor of Pharmaceutical Chemistry and Pharmacognosy at the Academy at Muenster. In 1891 he became Wiegand's successor at Marburg.

The writer recalls Professor Power's frequent references to Dr. Meyer in the course of our conversation.

(8) For the papers which Dr. Meyer had to his credit at that time, also for further details and portrait, see B. Reber, "Gallerie hervorragender Therapeutiker und Pharmacognosten" (1897), page 47.

(9) These thoughts were, no doubt, suggested by Dr. Power's happy independent position at Wisconsin.

(10) As the date of the letter indicates, this outing was planned between the winter and summer semesters, when German professors enjoy a somewhat longer vacation than do their American colleagues. It had long been a practice of German university professors to spend part of the spring vacation in Italy or the French Riviera. (Comp., *e. g.*, Strassburger's "Streifzuege an der Riviera;" also Flueckiger's "Osterferien im Sueden" in the *Arch. Pharm.*, 227, 1013; "An Easter Holiday in Liguria," 1877, translated from *Buchner's Report. f. Pharm.*, 25, page 449.

(11) It was Thomas Hanbury, who, in 1894, came to Genoa to bid the Flueckiger party farewell as the latter was bound for the United States. It was to the Hanbury villa that the returning party went from Genoa before going farther to Bern. See Frl. Flueckiger's (Mrs. Oesterle's) Diary, *N. Y. Apt.-Ztg.*, 49, 57. (Abfahrt von Genua) and page 58 (Aufenthalt bei Th. Hanbury in La Mortola bei Ventimiglia).

(12) Daniel Hanbury, as is well known, was co-author with Flueckiger of "Pharmacographia," the first edition of which had appeared in 1874. At the age of forty-nine, Daniel Hanbury had died in 1875.

CONFERENCE OF PHARMACEUTICAL LAW ENFORCEMENT OFFICIALS

ABSTRACT OF THE MINUTES OF THE MEETING HELD IN BALTIMORE, MAY 8 AND 9, 1930.

The First Session of the second annual meeting of the Conference of Pharmaceutical Law Enforcement Officials was called to order by the Chairman Robert L. Swain, May 8th, at 10:00 A.M. Those present at the meetings were Messrs. Phelps, Arizona; Gilbert, Marsland, Connecticut; Dougherty, Delaware; Kemp, Sanders, District of Columbia; Monroe, Florida; Stead, Georgia; Christensen, Illinois; Funk, Kelly, Indiana; Gibson, Judisch, Slocum, Iowa; King, Kansas; Legendre, Louisiana; Bernhardt, Eberle, Kelly, Swain, Maryland; Heller, Peterson, Minnesota; Caspari, Missouri; Woehner, Montana; Dow, New Hampshire; Fischelis, New Jersey; Anderson, Dandreau, Diner, Mather, Schaefer, New York; Ford, Freericks, King, Ohio; Roach, Oklahoma; Walton, Woodside, Pennsylvania; Adams, Texas; Kremers, Wisconsin; and others.

Chairman Swain delivered his address, and upon motion duly seconded, same was received for publication. (It is printed in July JOURNAL A. PH. A., pages 788–790.)

Secretary Ford made a verbal report of the activities of the Conference, and upon motion duly seconded, same was received and adopted.

He explained the reasons for not having a written report; the substance of his remarks is given in the following:

"Two very important meetings were held in South Dakota, last year, at which time enforcement methods were discussed. During the year, under the direction of Chairman Swain, he had sent out letters to all states—to those who are interested in the enforcement of pharmacy laws. Replies were received from all of them and numerous requests were made for information on law enforcement, and these requests, as far as possible, were complied with. He expressed the opinion that great progress had been made. There had been laxity in law enforcement; in Ohio progress had been made in restricting the sales of such items as carbolic acid.

It is hoped to obtain opinions regarding law enforcement from all State Boards of Pharmacy, from the State Attorneys and other enforcement agencies. Files have been started in the Secretary's office for convenient reference to information on laws and law enforcement, opinions rendered, etc. The states having had success in law enforcement will be able to aid states that have not been as successful. The Secretary's office can supply copies of many decisions. Coöperation in supplying information, should be given by members and secretaries of boards and associations. He referred to an experience when information was important; instead of securing copy

of the decision the correspondent replied "that copies of the decision could be obtained by addressing the Court;" delay would have been avoided, if the correspondent had secured the information. All changes in laws, decisions, etc., should be communicated to the Secretary's office, and reports made at the annual meetings."

At this time Chairman Swain called for the paper on enforcement procedure in New York by George W. Mather. Mr. Mather presented a very instructive paper on the requirements for registration of stores and the enforcement procedure. Many questions were asked from the floor and discussion entered into by many. Mr. Mather will furnish the Secretary sets of forms in use for those who may want them.

Chairman Swain next called for the paper on "The Relation of the U. S. P. and N. F. to Pharmacy Law Enforcement," by Robert P. Fischelis of New Jersey. In presenting his subject, Mr. Fischelis requested that all persons presenting papers be permitted to pass upon same before they were released for publication. With this assurance, Mr. Fischelis talked at length on his subject and proposed resolutions to be presented by this Conference to the U. S. P. convention on the subject of not admitting proprietary medicines to the U. S. P. and that synonyms shall be listed in the monographs and index of the U. S. P. The paper follows:

THE RELATIONSHIP OF THE U. S. P. AND N. F. TO PHARMACY LAW ENFORCEMENT.

BY ROBERT P. FISCHELIS.

Revision of the Pharmacopœia and National Formulary is imminent and it may therefore be timely to inquire whether certain improvements might not be made in the methods of stating standards and describing preparations which will assist pharmacy law enforcement. Of course, I have in mind particularly the enforcement of the pharmacy law in New Jersey, but what will be helpful in our state will also be of value in other states. I might say, briefly, that our law provides that drugs, medicines and poisons shall be sold only by registered pharmacists, assistant pharmacists or persons working under the immediate supervision of a registered pharmacist. Non-poisonous patent and proprietary medicines and simple non-poisonous domestic remedies sold by retail dealers in rural districts are exempted from this provision. Retail dealers are not defined. Rural districts are not defined and simple domestic remedies are not defined in the New Jersey law. Our law contains no schedule of drugs or medicines that may be sold by persons not registered pharmacists. Our Board of Pharmacy is empowered to make rules and regulations for enforcement of the law. Under this regulating power we have defined a rural district as an unincorporated place of less than 1000 inhabitants, situated at least two miles from a pharmacy supervised by a registered pharmacist. That definition has never been challenged in a court of law. We have defined simple domestic remedies without naming the remedies. Anyone engaged in this kind of work knows how difficult it is to prepare a list which will satisfy not only the retail dealers in rural districts who are selling medicines as an accommodation, but also the manufacturers who want to sell to dealers in rural districts and to any other kind of retail dealer anywhere. We have, therefore, refrained from making such a list public.

The procedure we follow is this: When a rural district store writes in and asks what sort of domestic remedy may be sold, we inform the dealer that the intent of the pharmacy law in this respect is to give people in the rural districts such emergency service as they might need, and not to make a pharmacy out of a general store. If the dealer will send us a list of the remedies for which he has a demand, we will check that list and advise him which items may be sold without the supervision of a registered pharmacist, and which may not. That has worked out pretty well with us and it has, to our mind, given people in the rural districts the service they need, and has saved the publication of a list which greedy manufacturers would take to the various stores and show the dealer as "a list of the products the Board of Pharmacy permits general merchants to sell."

Some general merchants, when called to account by our Board for selling drugs and medicines, have secured the backing of manufacturers in taking the matter to the courts. We have been consistently upheld in our work by the Supreme Court of the State. So far, the decisions have involved Tincture of Iodine, Camphorated Oil and Essence of Peppermint.

The Iodine case was easy because iodine is a poison. The question arose whether Camphorated Oil is a medicine or whether it is a domestic remedy, or whether it is a proprietary

preparation. In the district court where the case was tried, the testimony on our side was to the effect that it was a medicine and not a simple remedy because of the presence of camphor to the extent of 20%, which makes the preparation poisonous in sufficient dose, and therefore does not permit of its being classified as a "simple non-poisonous domestic remedy." The District Court upheld our view and the Supreme Court sustained the District Court.

Another case involved the sale of Essence of Peppermint in a delicatessen store. We maintained that this was a violation of the law as it constituted the sale of a medicine by an unregistered person. Again the Supreme Court sustained our contention.

One thing that helped in those decisions was the fact that in our testimony we could point to the listing of Essence of Peppermint and Camphorated Oil in the U. S. P. We said on the stand that the U. S. P. and the National Formulary do not include proprietary remedies. We were under the impression that the U. S. P. Convention had definitely laid down the policy that proprietaries shall not be admitted to the U. S. P. I have been told since then that the Convention is not entirely on record in the matter, but that it is a sort of unwritten law or general understanding on the part of the Revision Committee that proprietaries are not admitted, or at least, that the formula of every product admitted must be open and not secret.

I submit that the Pharmacopœia can be more helpful in law enforcement if the policy regarding proprietary preparations is definitely announced. One method adopted by manufacturers to make a proprietary preparation out of a well-known U. S. P. or N. F. formula is to change its name or to use a common synonym rather than the official title, hoping thus to escape the sales restrictions. I should like to see this Conference of Enforcement Officials go on record as asking that simple remedies, even though they may not be prescribed, be included in the Pharmacopœia as far as possible, taking into consideration, of course, the public demand for such products. I am particularly interested in preventing the deletion of popular remedies now included in the U. S. P. rather than in having many products added. The tendency has been to delete these preparations, and once they are removed from the standard works, there is sure to be a question, at least under our law, whether they are proprietaries or not. If they are listed in one of the two books, we have authority for saying they are medicines and as such, their sale is restricted to pharmacists.

In this connection it is also very important that the monograph of every official drug, chemical and preparation shall include all the known synonyms. Very often manufacturers, wholesalers and general merchants will offer an official product for sale under a synonym that is generally recognized in the trade, but does not happen to be mentioned as an official synonym. The latter fact is used as an argument in favor of the sale of such products without the supervision of a registered pharmacist.

It seems to me that "monoacetic acid ester of salicylic acid" should be named as a synonym of acetyl salicylic acid; "citrate of magnesia" should be mentioned as a synonym of solution citrate of magnesia; "Peroxide" and "Peroxide of Hydrogen" should be mentioned as synonyms of Solution of Hydrogen Peroxide; and so on. If these synonyms are made official, the tricky dealer cannot evade the Pharmacy and Food and Drug laws by using the common names of official articles to promote sales of inferior products.

Another point that most of you have had experience with, is the question of limiting the sale of drugs and medicines by general merchants to preparations listed in the U. S. P. or N. F. These works list a number of items used in preparing preparations which are not exactly drugs or medicines or, if used as drugs and medicines, are also used for culinary purposes. It occurred to us in New Jersey that this situation could be aided materially if the revisers of the Pharmacopœia would separate the items which are used as drugs and medicines from those which are used simply as adjuvants or for flavoring purposes. It is not a simple thing to do, of course, but it seems to us that it can be done. If all drug items were listed in Part I and the sale of such items could be restricted to pharmacists, and such items as sugar, salt, spices, etc., be listed in Part II with the statement that the standards for these items applies only to their use as drugs and that their sale is not restricted to pharmacists except when used as drugs or medicines, much of the unfair propaganda by general merchants on this point would fall flat. If you ask us to submit right here a definite plan of dividing these items in accordance with our suggestion and show you how it can be done, we shall have to say we have no such plan

ready, but we believe something of the kind can be done and ought to be done in the interests of those charged with the enforcement of the laws.

To summarize these, three suggestions are offered: *1.* That we oppose any further deletion of the so-called simple remedies which are purchased without physicians' prescriptions, but very often on the doctor's order. *2.* That we urge recognition of as many synonyms as possible in the official books. *3.* That we divide the items in the Pharmacopœia into sections based on their therapeutic activity so as to separate active drugs from mere adjuvants, technical preparations or flavors.

Discussion was entered into by Messrs. Walton and Swain, and the Chairman instructed Mr. Fischelis to prepare suitable resolutions and present them to the Conference at the next session.

Chairman Swain appointed a nominating committee consisting of L. L. Walton, Arthur Lee Phelps and Robert P. Fischelis.

At 12:00 o'clock noon, upon motion duly seconded, the Conference adjourned.

ROBERT L. SWAIN, *Chairman* M. N. FORD, *Secretary.*

The Second Session of the Conference of Pharmaceutical Law Enforcement Officials was convened at 2:00 P.M. by Chairman Swain.

J. W. Slocum of Iowa presented a paper on "The Restrictive Features of the Iowa Pharmacy Laws." The paper made reference to the recent decision of the State Supreme Court in which the Board of Pharmacy was sustained in the decision that Aspirin may be sold only by registered pharmacists. The paper was discussed from the floor with a great deal of interest.

THE RESTRICTIVE FEATURES OF THE IOWA PHARMACY LAW.

BY J. W. SLOCUM.*

The power to regulate the practice of pharmacy is vested in the State Legislature, and is in the same category as the power to regulate the practice of Medicine, Dentistry, Veterinary Science and other professions. This is commonly known as the police power of the state.

The term "police power" is not capable of exact definition, but it is exercised and defended on the ground of public welfare. It is intended to mean the power and function of government under a system of rules and administrative organization. Its purpose and aim, directly is to secure and promote public welfare, and it does so by restraint and compulsion.

It seeks to preserve order and prevent offenses against the state. As one of our able Iowa jurists has said, "to establish for the intercourse of citizens with citizens, those rules of good manners which are calculated to prevent conflict of rights, and to insure to each the uninterrupted enjoyment of his own, so far as it is reasonably consistent with the enjoyment of the rights of others."

When the legislature of a state exercises this power, there are certain limitations which are defined by the courts, and indicated by the fundamental law, the constitution of the state, and the constitution of the United States.

The question of equality is of paramount importance, so that in its operation it will affect all citizens alike in the class in which it operates. Some states differ from others in the interpretation of the statutes within their respective jurisdictions. When exercising police power the restrictions and regulations enacted must be proper and reasonable, and it is always a question for the courts of last resort to decide.

The word "law" as generally defined refers to the written law, but the great body of law which controls human conduct is not written at all. From time immemorial there have been customs which by common consent have come to be regarded as a part of the law, and which is known as the common law. An old maxim states, "One must use his own property so as not to injure that of his neighbor." This is not written law but, because of generally recognized difference between right and wrong, it is a part of the unwritten law of the land. It is not very often that a state legislature abrogates any principle of common law, if it is in harmony with the spirit of our institutions.

The common law is elastic and is adaptable to new conditions. A judge of our Supreme Court has said "That the common law has grown with civilization and kept pace with the march

* Chairman Iowa Board of Pharmacy.

of events, so that to-day it is as virile in our advanced state of civilization, as it was when the race was emerging from the dark ages of the past."

What is known as statutory law relating to pharmacy, has reference to the details of the practice of pharmacy, but the great body of substantive law which defines the obligations and liabilities of the pharmacist is a part of the common law. A wrong has been defined as the deprivation of a right, and public wrongs are those which affect society as a whole, and if of a very serious character are called crimes. Crimes are divided into two general classes, felonies and misdemeanors. Any crime less than a felony is a misdemeanor. In the state of Iowa, if the penalty does not exceed a fine of $100 or imprisonment for more than 30 days, it is triable without indictment.

In the regulation of human conduct, the law recognizes man's fallibility and the fixing of responsibility, impossible or unreasonable standards are seldom set. It is a generally conceded fact that one should not be held responsible for the inevitable, nor be expected to perform the impossible, but in order to properly safeguard the public, certain restrictive laws have been deemed necessary in every state of the Union.

In order that the public may be properly protected, the dispensing and compounding of drugs and medicines is specifically delegated to registered pharmacists. In Iowa the pharmacy law states that persons, who assist in the selling or dispensing of drugs and medicines, under the supervision of a registered pharmacist, are not engaged in the practice of pharmacy. This is undoubtedly intended to protect the assistant or apprentice from personal prosecution, and places the responsibility for his actions squarely upon the shoulders of the pharmacist in charge.

Another section says that "No licensed pharmacist shall allow anyone who is not a licensed pharmacist to sell or offer or expose for sale, or dispense drugs and medicines, or fill the prescriptions of licensed physicians, dentists or veterinarians, unless the same be done under the supervision of a licensed pharmacist."

This section of the law is probably more often violated than any other. The word "supervision" is sometimes construed to mean, that the store itself is under the supervision of a registered pharmacist and that this does not necessarily mean that the pharmacist should be present when each individual sale or act of compounding is actually performed. We had one attorney general who placed such a construction upon this section, and the Pharmacy Board was handicapped in enforcing this provision of the law.

We hold that the intent and purpose of the legislature was to protect the public from unrestricted dispensing. We have in mind an amendment for this section which would insert the words "immediate supervision" thus making it mandatory that no such dispensing be done unless the pharmacist be present in the store.

In this connection we are convinced that our law is not as restrictive as it should be. In some states the law is plain that when a drug store is open for business that a pharmacist must be in charge at all times, except for temporary absence, and then by defining the term "temporary absence" the law in its intended provisions are obvious and not subject to extravagant interpretations in order to protect some violator.

The fact that proprietary medicines may be sold unrestricted and in addition to this a limited number of package drugs, known as household or domestic remedies, makes it difficult to draw the line and determine just how far a merchant can go without violating the law. Unfortunately, our law does not state who shall determine the limitations of the list known as "domestic remedies" and in the absence of this provision the final decision must necessarily be made by a lawyer or a judge who makes no claim to any knowledge of drugs, whatsoever.

In our estimation the law should provide that the Board of Pharmacy should be given the power to make a list of domestic remedies and limit the sale, by merchants, strictly to this list. Otherwise pharmaceutical and wholesale houses might put up potassium iodide or bismuth subnitrate and kindred drugs, in their package lines and sell them to grocers and so-called drugless drug stores throughout the state. At one time our attorney general ruled that aspirin was a domestic remedy and that its sale could not be restricted. This made it difficult to confine the sale of such drugs to drug stores, and not until the U. S. P. X came into force and effect on January 1st of 1926 did we have an opportunity to secure any recognition of the rights of the pharmacist in restricting the sale of this and similar drugs.

As soon as this became effective the Board of Pharmacy felt justified in making a fight

to restrict the sale of aspirin to drug stores. One neighboring state had succeeded, and others failed, but we were determined that we could prove that acetyl salicylic acid could not now be construed to be a domestic remedy or a proprietary medicine.

Evidence was gathered from various sources to substantiate our contention. The medical profession backed us up in our conclusions and rendered substantial aid. With this evidence in our possession we made our first assault on the attorney general's office, presented our evidence and requested a ruling.

The fact that aspirin was now recognized by the United States Pharmacopœia was the final convincing evidence. The attorney general rendered an opinion upholding our contention and we thought that we could restrict the sale of aspirin when we were backed up by this opinion. But we were sadly mistaken as we met determined opposition almost immediately from the Grocers' Association, who proceeded to notify their members that the Pharmacy Board could not enforce such a ruling and urged them to continue the sale of aspirin with the injunction that if litigation was brought, the Grocers' Association would provide attorneys to fight the case for them.

The attorney general suffered a relapse for some unaccountable reason and attempted to withdraw the decision. We became aware of this and when he appeared before the Board to argue the case, he was faced by about thirty men, who had been hurriedly summoned. This group was composed of pharmacists, chemists and one or two prominent physicians who were prepared to present definite and substantial evidence that we were right, and that the sale of aspirin should be restricted.

He allowed the opinion to stand but informed us that if we brought action to enforce it he feared we could not win in the courts. This virtually rendered us powerless to proceed. After about a year and a half of delay in which we held many conferences with attorneys, we were advised that a test case would be necessary, as arguments *pro* and *con* would continue until the courts decided it. The test case was finally filed against a grocer who was induced to be the victim. The case was filed in the District Court of Polk County, Iowa, and was prosecuted by the county attorney. The courts were crowded, and despite all our efforts an assignment could not be secured for many months. In the meantime the defendant in the test case became financially embarrassed and went into the hands of a receiver. This placed us in the peculiar position of bringing suit against a merchant who was not even in business. However, after several conferences with the defendant's attorney this was ironed out and he was authorized to proceed.

After several postponements the case was set for hearing on January 14th of 1929. Two members of the Board of Pharmacy, two expert chemists and two prominent physicians were summoned to appear as witnesses for the state. The testimony showed conclusively that acetyl salicylic acid was a drug as defined by the law and could not be classed as a domestic remedy or a proprietary medicine. The defendant's attorney tried to convince the court that because the U. S. P. recognized it as a drug, that this was not sufficient, and pointed out the fact that the law said that, "drugs and medicines shall include all substances and preparations for internal and external use recognized by the United States Pharmacopœia and National Formulary, and any substance or mixture of substances intended to be used for the cure, mitigation or prevention of diseases of either man or animals," and that such food products as honey, lard, suet, sugar and others, which were not classed as drugs are also recognized by the U. S. P. and because of the fact the state could not consistently claim that all such should be sold only by registered pharmacists.

It was this contention which was upheld by the courts of Nebraska and the pharmacy law was declared unconstitutional. However, we showed by evidence that pharmacists made no claim to the exclusive sale of food products, recognized by the U. S. P. and that the only reason they were so recognized was because they were included in this book of recognized authority in order to establish a standard of purity.

The court took the matter under advisement and after about ten days rendered a decision upholding our contention that aspirin is a drug as defined by the law. Under an agreement previously entered into with the defendant's attorney, he began preparing his brief for an appeal to the Supreme Court. It was filed for hearing in October of 1929, but did not reach a

hearing until November 21st. On December 13th the good news reached us that the Supreme Court had upheld the Lower Court and we had won a decided victory.

We proceeded to notify every wholesale grocery house in the state, which had been the source of supply for most of the aspirin, illegally sold, advising them of the decision of the Supreme Court. Notices were also sent to every county attorney, and to the 400 medicine venders who are paying licenses in Iowa. In addition to this the news of the decision was published in about 200 newspapers and broadcast from some of the radio stations. As a result a large part of the illegal handling of aspirin has been discontinued.

The members of the Board of Pharmacy are still handing out the notices and in every case so far, there has been no tendency to fight the decision and within a few months we hope to have the matter well in hand. In spite of the fact that many druggists said it could not be done, we continued the fight for three years and won by sheer persistent effort. It won for us not only great satisfaction but a wholesome respect for pharmacy law which was not evident before.

One result of this, however, has given us one cause for worry. This was a statement in the decision of the Supreme Court which stated, "We do not deem it necessary to pass upon the question as to whether or not section 2580 is constitutional. We expressly reserve any pronouncement upon said question." At least the inference is there that if called upon to pass on the constitutionality of this section they might be compelled to find it invalid. Therefore, we have it in mind to make an effort to change the wording of our law, so that it would withstand an assault, or a suit to test the constitutionality of this particular section.

We are glad to state, however, that the restrictive features of the Iowa law, in most instances have proven quite adequate and a vigorous campaign of enforcement is now in progress. In numbers of instances drug stores have fallen into the hands of unregistered owners and in many of these there are stocks of drugs which the owners cannot legally sell, without employing a registered pharmacist, which is apparently the last thing they expect to do.

By a peculiar twist of the law we cannot force them to remove these drugs from the premises, but we can prosecute them if they attempt to sell them. In some instances we manage this by telling them we will not attempt prosecution for violation if they will remove these drugs from the store.

During the month just past I personally saw to the removal of four different stocks by this method. One case was prosecuted for selling strychnine and other poisons, and fined $100 and costs, and after this was over they requested a member of the Board to check the store and said they wanted to remove all drugs from the store which they could not legally sell. They had learned a rather expensive lesson. We construe our law to mean that unregistered owners cannot sell drugs in bulk because in the weighing up or measuring of drugs they are practicing pharmacy and the offense carries a minimum fine of $100 and a maximum of $1000. We instruct them as a rule to follow—that they purchase no goods labeled "poison," except insecticides. By being asleep at their posts the druggists permitted the exclusive sale of insecticides to be taken away from them.

We have a vendors' law which requires vendors of medicines to secure a license from our department which costs them $100 per year. Regardless of the fact that some neighboring states require no license at all, or a very small one, we have more than 400 of them actively engaged in the business.

Some near vendors evade the law by selling only toilet articles and merchandise, which changes their title to that of a peddler, but he is never-the-less a menace to the drug business. The state law provides for a peddler's license of $75 per year but this provision does not come under the jurisdiction of the Board of Pharmacy and is not being enforced.

The restrictive features of the Iowa law regarding the displaying of signs using the words "drugs" or "pharmacy" are not very explicit but we have had no trouble in prohibiting it, simply going on the supposition that the law is adequate to our needs. We have not felt that we could legally prevent the use of the sign "drug sundries" as that term does not necessarily mean that the store is dealing in drugs.

One of the most difficult problems in our state is the question of one-man drug stores. By this I mean the pharmacist who owns his own store in the average small town and in which he puts in practically his entire time. His business does not admit of another pharmacist being

employed, and he must of necessity be absent for his meals, and for required business conferences, etc. To require him to employ a pharmacist in order that one shall be present during these temporary absences is prohibitory in numerous instances.

On the other hand city drug stores claim the same privilege, although conditions are considerably different, as they keep their stores open longer hours as a rule, and the clerks in the cities demand shorter hours. Hence, when the store is open for 17 hours and the registered man is only there for ten hours we have a store that is operated forty per cent of the time without a pharmacist on duty. Legislatures can hardly be expected to frame provisions of law to fit both cases, and for that reason we are of the opinion that the temporary absence clause will come as near solving the problem as any suggestion that has been made.

In the discussion which followed it was brought out that Iowa, through a vendors' license law, carefully controls the sale of medicinal preparations by itinerant vendors and confines such dealers to the sale of patent medicines. Those entering into the discussion were Messrs. George Judisch, L. L. Walton, M. N. Ford, the Chairman and the author of the paper.

ENFORCEMENT POWERS OF BOARDS OF PHARMACY.

BY M. N. FORD.

At the request of Chairman Swain "The Enforcement Powers of Boards of Pharmacy" was discussed by M. N. Ford, secretary of the Conference and also secretary of the Ohio Board of Pharmacy. This subject embraced a consideration of the general law enforcement powers vested in the boards, and also the broader aspects of law enforcement resulting from a merger of the boards of pharmacy with other branches of the state government or when vested in some department independent of the board of pharmacy. Secretary Ford reviewed the various pharmacy law enforcing agencies, and said that in many instances the boards possessed wide powers which could be called into play as a means of securing a more satisfactory observance of the pharmacy laws. It was stated, as a controlling principle, that the enforcing agency should be fully informed as to the purpose of the law and also sympathetic with this purpose. As a general thing the Board of Pharmacy is laboring under a load of administrative detail which would make it welcome a transfer of enforcement work to other agencies if this could be done without sacrificing efficiency. Experience, however, in many states has shown that this phase of the work suffers when it is removed from those directly interested in maintaining the proper legal status. Because of this basic principle, the speaker expressed the opinion that the public benefits to greater extent by vesting enforcement in the hands of the board of pharmacy. Mr. Ford urged every state to give serious attention to the powers which the boards possess and to extend them by legislation when this is required, or by board ruling, when this is provided for, so that better conditions may be brought about. The opinion was expressed that increased professional prestige and a more secure economic position would follow a satisfactory observance of the law.

In discussing Secretary's Ford's paper Robert P. Fischelis said: "Mr. Ford's remarks were very interesting to me. New Jersey has been giving attention to recommendations for reorganization of the state government. The recommendation was that the examining boards be consolidated in some way under the state department of education in the interest of economy. I could not see where the state would be the gainer if the activities were transferred to another department. We have only a sufficient number of clerks and other assistants to actually take care of the work which comes to our attention, and we know that if we go into enforcement work it would require additional help. To carry on the work there would have to be as many people in the Department of Education as we have, so I fail to see where there would be any economy. But it is my opinion that to turn over the enforcement activities to any agency who is not interested would seriously hamper the work. I am interested in knowing whether Mr. Ford or anyone can furnish me with any arguments outside of the one which I have given for retaining the enforcement by the Board of Pharmacy, and if there is anyone here who has had experience in the enforcement activities removed from the Board of Pharmacy and taken over by another department and whether the enforcement is less efficient. Of course, the case of Maryland I understand is a very sound one. But I don't know just how efficient it would be if the secretary of the Board of Pharmacy and the drug commissioner positions were held by anyone else."

ENFORCEMENT IN MARYLAND.

BY E. F. KELLY.

Chairman Swain introduced Dr. Kelly as the official representative of the State Department of Health of Maryland. He said: "We undertook this movement in Maryland some years ago and went to our good friend, Governor Ritchie. He associated our work very clearly with other public health activities. He believes that public health work and public education are among the more important branches of the state government. He was very much interested in pharmacy work in the state. He first proceeded to place a pharmacist on the Board of Health, consequently we have a representative on the Board of Health. The Pure Food and Drug Law was amended to provide that the Food and Drug Commissioner or the Deputy Food and Drug Commissioner should be a registered pharmacist and then we put the enforcement of the act in the Board of Health. If Dr. Swain should happen not to be the secretary of the Board of Pharmacy, it wouldn't make much difference so far as enforcement is concerned, as we must have a registered pharmacist either as Food and Drug Commissioner or Deputy Food and Drug Commissioner. All of our enforcement work is done through an appropriation from the state of $10,000 which provides for Dr. Swain and two inspectors. We plan to have an inspector visit every drug store in Maryland at least every thirty days. We have developed now the very closest connection with the Board of Health, and when the Board of Health proposes to do something that might interfere with our work, we are in a position to discuss and oppose it. I hope I have covered the question."

Dr. Fischelis in responding said: "Of course, we can conceive of a situation where a State Board of Health, as in some states, is made up of purely political appointments. That may not be possible here, but it is possible in some states. They could easily appoint a registered pharmacist who would soft pedal pharmacy work, meaning it might be used for political rather than public good. I am commenting from what I have seen of the political situation."

Dr. Kelly replied: "In the first place, we proceeded on the theory that pharmacy should not be taxed for law enforcement. We feel that the State of Maryland doesn't charge other divisions of society or professions to enforce their laws, and we do not feel that we should do it. The state should pay for the enforcement. Second, whether this is right or wrong, we feel that if we have a good strong pharmaceutical organization it would be able to take care of itself. We know that the Board of Health in Maryland is not a political body. I have never been approached by any politician as a member of the Board of Health. We have been fortunate in having such men as Dr. Welch interested in the Board of Health."

LAW ENFORCEMENT IN TEXAS.

BY WALTER D. ADAMS.

"Law Enforcement in Texas" was discussed by Mr. Walter D. Adams, *secretary* of the Texas Pharmaceutical Association. This subject was to have been discussed by Walter H. Cousins, *secretary* of the Texas Board of Pharmacy, but he was not able to be present. Mr. Adams explained that the Texas Pharmaceutical Association and the Texas Board of Pharmacy were entirely separate and that the latter was the lawfully designated enforcing agency. He reviewed the efforts to secure the present pharmacy act in Texas and expressed the belief that the law would be quite effective in bringing about greatly improved conditions. The law attempts a comprehensive definition of a pharmacy and is comprehensive in restricting all signs indicating a pharmacy to a place meeting the legal description. The speaker said the law had not been in effect long enough to forecast the results which will follow its enforcement or to point out in what respects the act is deficient. However, even in a short time, much definite improvement had been noted especially in a reduction in the illegal use of drug signs, and in the attempts to mislead the public by misrepresentation of the type and nature of stores not operated by registered pharmacists.

"Inspection Procedure in the District of Columbia" was discussed by Inspector R. A. Sanders of the Metropolitan Police Department of the District of Columbia. The presentation follows:

INSPECTOR'S PROCEDURE IN THE DISTRICT OF COLUMBIA.

BY R. A. SANDERS.

Synopsis of the Laws of the District of Columbia to regulate the practice of pharmacy, sale of poisons and other purposes, as enacted by Congress May 7, 1906, and as amended February 27, 1907, and March 4, 1927, and method of enforcement, which provides as follows:

The Commissioners of the District of Columbia shall appoint a Board of Pharmacy, consisting of five licensed pharmacists, each of whom shall have been, for the five years immediately preceding and during the term of his appointment, actively engaged in the practice of pharmacy in said District.

All appointments shall be made in such manner that the term of office of one member shall expire each year. Any member may be removed by the Commissioners after full hearing, for just cause.

The Board shall elect a president, a secretary and treasurer, and have a seal. Said Board shall hold meetings for the examination of candidates and for the discharge of such business as may come before it, in January, April, July and October of each year, and other times as the Board may determine. Said Board shall keep records of proceedings, which shall be *prima facie* evidence of all matters contained therein in all courts in the District of Columbia. In July of each year the Board shall make report to the Commissioners of its proceedings, receipts and disbursements, and of all licenses and permits issued.

During the month of November of each year every licensed pharmacist and dealer in poisons for use in the arts, or as insecticides, whose license or permit is not less than three years old, shall apply for renewal. Upon payment of the required fee, the Board is authorized to renew such license or permit for a period of three years, and every license or permit not renewed within the month of November shall be void until renewed. No person shall make any fraudulent representation to procure license, permit or renewal of same. Any license, permit or renewal procured by fraud shall be void. Should the Board fail or refuse to renew any license or permit for which application has been made, it shall make record of reasons for such non-renewal. Upon request of the person seeking renewal, he shall be granted a hearing with privilege of counsel, introduce evidence, examine and cross-examine witnesses.

The Secretary to the Board is empowered to administer oaths. Said Board shall have power to issue subpoenas, require attendance of persons with documentary evidence and testify in any and all matters within its jurisdiction. Upon the failure of any witness to attend, testify, produce any book or paper, as the case may be, the Board shall have power to refer the matter to any Justice of the Supreme Court of the District of Columbia, where such witness may be punished for contempt of court.

Any party aggrieved by a decision of the Board may seek a review thereof in the Court of Appeals of the District of Columbia, who shall review the record of proceedings in the case and affirm, reverse or modify the judgment in accordance with law.

Every license to practice pharmacy, permit to sell poison for use in the arts or as insecticides, and renewals shall be displayed by the person to whom the same has been issued in their place of business.

Applicants for examination for license to practice pharmacy shall pay a fee of fifteen dollars; each renewal thereof, three dollars; permits to sell poison, one dollar; renewal thereof, fifty cents.

All expenses of the Board incident to the execution of the provision of this Act shall be paid from fees collected aforesaid. If any balance on hand June 30th of any year, the members of the Board shall be paid such amounts as the Commissioners of the District of Columbia may determine.

Every applicant for a license to practice pharmacy shall be not less than twenty-one years old, of good moral character, not addicted to the use of alcoholic liquors or narcotic drugs, must have had not less than three years' experience in the practice of pharmacy under the instruction of a licensed pharmacist, and be a graduate of an accredited school or college of pharmacy. Provided, however, the Board of Pharmacy, in its discretion, may establish, by general rules, conditions whereby credit for experience in the practice of pharmacy may be allowed, and submit to an examination by the Board of Pharmacy as to his qualifications to practice pharmacy.

If the applicant has complied with all the above requirements and successfully passed the examination, the Board shall issue a license, which shall entitle him to practice pharmacy subject to the provisions of this Act.

The Board may issue license to practice pharmacy in the District of Columbia without examination, or after limited examination, to licensed pharmacists in the states, territories or foreign countries, provided the applicant presents satisfactory evidence of qualifications equal to those required of licentiates examined under this Act, and that he was licensed after examination in such state, territory or foreign country not less than one year prior to date of application, and that such state, territory or foreign country accord similar recognition to licentiates of the District of Columbia. The fee for such license shall be ten dollars.

The license of any person to practice pharmacy may be revoked if such person procure same by fraud, or is addicted to the use of narcotics or alcoholic stimulants, or is suffering from physical or mental disease in such manner and to such an extent as to render it expedient that in the interest of the public his license be canceled, or to be of an immoral character, or if such person be convicted of any offense involving moral turpitude. It shall be the duty of the Major and Superintendent of Police to investigate such case and report the result of such investigation to the Board of Pharmacy, which Board shall, after full hearing, if in their judgment the facts warrant it, revoke such license.

Dealers in drugs, chemical compounds and combinations thereof are confined to four classes, first, drug store or apothecary shop or other place of business for retailing, compounding or dispensing of any drugs, chemicals or poisons on physicians' prescriptions or otherwise. Such places shall, at all times, be in immediate charge of a licensed pharmacist. No owner or manager shall permit any person other than a licensed pharmacist to compound, dispense or sell at retail any drug, medicine or poison, except as an aid and under the proper supervision of a licensed pharmacist. Nothing in this provision shall be construed to interfere with practitioners of medicine, dentistry or veterinary surgery in compounding of his own prescription, or prevent supplying his patients with such medicines as he may deem proper.

Second class—Exclusively wholesale dealer in drugs, who shall be a licensed pharmacist, or keep in his employ at least one person who is so licensed.

Third class—Dealer in poisonous substances by other than pharmacist by authority of a permit from the Board of Pharmacy, sold exclusively for use in the arts, and as insecticides, and in unbroken packages, labels bearing name of contents, the word "Poison," a suitable antidote, name and address of vendor, who shall be not less than twenty-one years old, nor can any poison be sold to a person under eighteen years of age, except upon a written order of a person known or believed to be an adult.

Fourth Class—Dealers in compounds commonly known as patent or proprietary medicines, not regulated by the provisions for poisons and narcotic drugs.

All dealers selling poison at retail shall first learn, by due inquiry, that person to whom delivery is about to made is aware of the poisonous character of the substance, and that it is desired for a lawful purpose. The box, bottle or package shall be plainly labeled with name of the substance, the word "Poison" in plain uncondensed Gothic letters in red ink, and suitable antidote, the name and address of person, firm or corporation dispensing the substance, and before delivery there shall be recorded in a book known as a Poison Register the name of the article, the quantity delivered, the purpose for which it is to be used, date of delivery, name and address of the person for whom procured, and the name of the person dispensing the same. Said book shall be preserved by the owner thereof for at least three years after the date of last entry therein, and open to inspection by any duly authorized officer of the law.

The record of sale above mentioned shall not be required of manufacturers and wholesalers to pharmacist, but the package shall be properly labeled with the name of substance, the word "Poison," and the name and address of manufacturer or wholesaler. It shall not be necessary in sales at wholesale or retail to place a poison label upon, nor record the delivery of, preparation containing poison when a single box or package or bulk of half fluidounce or the weight of one-half avoirdupois ounce does not contain more than an adult medicinal dose of the poison; nor to liniments or ointments sold in good faith as such, when plainly labeled, "For external use only;" nor to preparations sold in the form of pills, tablets or lozenges containing poisons

intended for internal use, when the dose recommended does not contain more than one-fourth of an adult medicinal dose of such substance.

No person seeking to procure any substance the sale of which is regulated by the provisions of this Act shall make any fraudulent representations so as to evade or defeat the restrictions herein imposed.

The proprietor or manager of a drug store shall keep a file in which shall be preserved for a period of not less than three years the original of every prescription compounded at such store. A copy of such prescription may be furnished the prescribing physician or the person for whom prescribed. All prescriptions and Poison Register shall be open to inspection by duly authorized officers of the law. No drug shall be dispensed without marking on container the name of drug or drugs contained therein or direction for using the same.

No person shall sell or offer for sale by peddling, or offer for sale from house to house, or by public outcry, or by vending in the street any drug, medicine, or chemical, or implement, appliance or other agency for the treatment of disease, injury or deformity. No person shall throw, cast, deposit, drop, scatter or leave, or cause the same, any drug, medicine, or chemical, compound or combination thereof, upon any public highway or place, or without the consent of the owner or occupant thereof, upon any premises.

No person not licensed as a pharmacist shall take, use or exhibit the title of pharmacist, or licensed or registered pharmacist, or title of druggist or apothecary, or any other title or description of like import.

No mention has been made of the provision of this law regulating the sale of narcotic drugs, as it conflicts with the Federal Harrison Narcotic Act, and is superseded by the same.

Any person violating any of the provisions of this Act shall be deemed guilty of a misdemeanor, and upon conviction shall be punished by a fine not to exceed two hundred dollars, or by imprisonment not exceeding six months, or both such fine and imprisonment, in the discretion of the Court, and if the offense be continuing in character, each week or part of a week during which it continues shall constitute a separate and distinct offense, and it shall be the duty of the Major and Superintendent of Police and the Corporation Counsel to enforce the provisions of this Act.

The Police Department has detailed one detective sergeant and one private, commonly known as Pharmacy Inspectors, who supervise the enforcement of the laws regulating the practice of pharmacy, sale of poisons, and for other purposes, practice of the healing arts, practice of dentistry, practice of veterinary medicine, and assist in the enforcement of the Harrison Narcotic Law in the District of Columbia. They are assigned to the Detective Office under the direction of the Assistant Superintendent of Police in Charge, and subject to all rules and regulations governing the same. All complaints and information reaching the department alleging violations or suspected violations of the laws supervised by the Pharmacy Inspectors are referred to them for investigation and proper action. All reports of suicides, attempted suicides by any drug or chemical or compounds or combinations thereof, and accidental poisoning, are investigated by the Pharmacy Inspectors to ascertain whether or not the poison was purchased lawfully, sold lawfully, or any foul play, resulting frequently in prosecution of the purchaser of poison for making false representation to procure the same, or the seller of the poison for failing to properly label or register.

Frequent and unexpected visits are made to all places where drugs are sold, to inspect records of poison sales, prescription files, license and renewals of pharmacist, observe their conduct, as well as that of the junior clerks, as to sobriety, and that all places where drugs are compounded and dispensed on prescriptions, or otherwise, are properly manned by licensed pharmacist. When making inspections, a complete record is made of the stores, showing the trade name and address, name of owner or owners, whether or not pharmacist, names of all pharmacists employed, and all junior clerks and their length of service as such. Any conduct on the part of a licensed pharmacist or a junior clerk serving his apprenticeship, observed by the Pharmacy Inspectors or disclosed by investigation, or any physical or mental condition that would render it expedient that in the interest of the public he should not practice, is reported to the Board of Pharmacy in detail for their consideration and such action as they deem advisable.

In all prosecutions for violations of the provisions of the Pharmacy Law it is the duty of the Pharmacy Inspector to present the facts in the case to the Corporation Counsel at Police

Court, who will file with the Clerk of the Court any information setting forth the facts. The case is called to trial in the District Branch of the Court, the Corporation Counsel appearing as prosecuting attorney to the conclusion of the case.

M. N. Ford, referring to the actual presence of a registered pharmacist in each store, asked Mr. Sanders what would be his procedure if he happened in a drug store in the afternoon and there was no registered pharmacist in charge.

Mr. Sanders replied that he would take the owner into court and charge him with permitting his clerk to practice pharmacy unlawfully and his clerk for practicing pharmacy unlawfully. If he happened in a store and the proprietor had stepped across the street, he would not take him to court unless he had reason to believe that it is a practice. "The proprietor is prosecuted for permitting his clerk to practice pharmacy and his clerk for practicing pharmacy without a license," he said.

L. L. Walton said that the Pennsylvania law penalizes the pharmacist for permitting an unregistered man to compound or dispense medicines. In order to prove that the gentleman practiced pharmacy, something must be shown to the court to prove that he was actually practicing pharmacy.

Robert P. Fischelis asked, "Suppose the registered pharmacist left the store and put up a sign 'Drug Department Closed?'"

Mr. Sanders replied that they have had one case of that kind. The pharmacist said he would go to court rather than give up his afternoons. The case went to court and conviction resulted.

Mr. Legendre, of Louisiana, presented an appeal for the states to have the state narcotic law repealed. The question was discussed by Messrs. Walton, Fischelis, Ford, Johnson and Swain, with no action taken by the Conference.

GEORGIA DRUG LAWS AND THEIR ENFORCEMENT.

BY A. M. STEAD.

"Georgia Drug Laws and Their Enforcement," was discussed by A. M. Stead, chief drug inspector of that state; it follows:

The Food and Drugs Act of Georgia was passed in August 1906, and is practically a duplicate of the Federal Food and Drugs Act. This Act, which authorized the office of the Chief Drug Inspector, is being enforced in conjunction with all of the Pharmacy Laws of the State, this being the purpose of the Act. The Chief Drug Inspector is appointed by the Commissioner of Agriculture at the suggestion of the Board of Pharmacy. He has charge of all drug inspection of the state. Assistant drug inspectors are appointed by the Commissioner of Agriculture. The Food and Drug Division has eight district food inspectors who coöperate with the Drug Division in Pharmacy Law enforcement in their districts. For the past three years, this has worked so admirably that when the Georgia Pharmaceutical Association, in assembly, was asked by wire signed by a member of pre-legislature committee whether they would like to remain in the Department of Agriculture or be placed under the Board of Health, or otherwise, the Association went on record as unanimously requesting that the drug inspection be left as one of the divisions of the Department of Agriculture.

It seems that our pharmacy laws are somewhat unique in that they are worded a little different than those of most other states.

Our pharmacy law expressly forbids anyone to vend medicines, drugs and poisons within the state and then, as it were, by three gates or exceptions, lets in three classes; namely, pharmacists, doctors and merchants. It defines the circumstances under which each of these classes may operate. In dealing with pharmacy, it defines a pharmacy or drug store as being a place where medicines, drugs and poisons are dispensed, compounded or sold at retail by persons who are duly licensed and registered by the Georgia Board of Pharmacy. Doctors may fill their own prescriptions in their offices and dispense medicines to their patients. The third exception, relating to merchants, must be construed in the interest of public health. It permits them to sell home remedies and patent or proprietary preparations—not poison—when sold only in the original and unbroken package. The best clause in the Pharmacy Law is that the law shall be construed in the interest of public health. This gives the department, charged with its en-

forcement, latitude in making rulings in the interest of public health where the definitive wording of the Act is not explicit. Under this clause, we have removed from mercantile stores certain commodities, which prove detrimental to public health when distributed by them, and placed them under drug control.

A recent ruling in the interest of public health prohibited the use of vending machines in selling Aspirin and other drugs in the state.

The Pharmacy Law provides an emergency fund which is held in the state treasury and which may be used by the Board of Pharmacy for prosecutions and other emergencies.

The state is covered with a general inspection every six months which includes the inspection of drug stores, soda companies, wholesale houses and other stores. When a drug store is inspected, each pharmacist's license therein displayed is marked with a round seal sticker bearing the date of the inspection, the name of the firm and the name of the inspector. This is for reference in future inspections and to detect the removal of a pharmacist from one store to another, in many cases a short time after an inspection has been made. These changes are always given special attention by mail or otherwise.

The department has also installed an information bureau for the use of licensed drug clerks desiring employment, and for the use of pharmacies needing the services of a registered drug clerk. This feature supplements the information gathered from the inspection seal, and these vacancies are diligently checked by our law enforcement department. Replacements are insisted upon where the law is being violated. Our aim is to constructively enforce the Pharmacy Law in the interest of public health, and we find that the publicity given relative to its benefit and protection to the public is the greatest adjunct to aid its enforcement.

"Inspection of Drug Stores in Florida," was discussed by H. R. Monroe, drug inspector of that state, operating under the jurisdiction of the Florida State Department of Health.

The work of inspection of drug stores and pharmacies in Florida and the enforcement of the laws governing their conduct has been in progress since the first of August 1928. In the beginning, the work was in the nature of an effort to get as complete a survey of conditions as possible and to acquaint the pharmacists, and owners of pharmacies and drug stores with the nature of the work, and secure, as far as possible, the coöperation of all concerned. One of the greatest and fast growing evils at the time that the work started was the use of the words pharmacy, drugs, drug sundries, drug store, etc., by any person who cared to use them. Thus we found such signs being used by most all places where patent medicines were sold and among these places we found pool rooms, filling stations, stationery stores, so-called sundry stores, general merchandise stores, and many other kinds of stores. Unfortunately, the law passed by the Legislature of 1927, intended to prohibit the use of these signs by any place of business that was not a pharmacy or drug store in the true sense, has been rendered null and void, by a proviso attached to it, at the request of parties that are opposed to the restriction of the use of drug and pharmacy signs to those persons who are legitimately entitled to use them, and this retarded the work of having the illegitimate ones removed. However, the legislature of 1929 passed another law amending the first one, and since that time about 275 signs have been removed. None of the cases made for the illegal use of signs have been fought in court, so far, and I do not believe any of them will be.

The work of confining the practice of pharmacy to those persons who are registered as pharmacists in Florida, has been a case of increasing pressure being brought to bear on violators and this is being done as rapidly as the inspectors can get around in the state and collect evidence.

At first, it was found that very few prosecuting officers had any knowledge of such a thing as a pharmacy law in Florida and it could readily be seen that most of them did not consider it of much importance, and thus, of course, in some instances, the action was very slow. I presume it is natural and that you have had the same experience. There have been 122 legal proceedings started against violators, this number including information given to prosecutors, and the more direct action of getting warrants for arrest from justices of the peace. These proceedings have resulted in 100 arrests, the remaining 22 cases having been settled out of court, because some prosecutors prefer to prevail on the defendants to get right without recourse to court action. The charges against defendants have been for illegal compounding, illegal dispensing, permitting illegal compounding and dispensing, illegal display of signs and refusal to register stores with the State Board of Health.

There has been only one case that was fought hard in court. The charge in this instance was unlawful compounding of physicians' prescriptions by a person who was not a registered pharmacist, and after being out about five minutes the jury returned with a verdict of guilty. The fine was $100. In most cases the defendants plead guilty and have been given a fine or a suspended sentence.

It is my opinion that our work is making an impression on the violators, both potential and actual, of the seriousness of violations against our pharmacy laws, and paving the way for a more adequate set of laws and possibly a more adequate legal machinery for their enforcement.

Each of these papers was discussed from the floor by Messrs. Ford, King, Walton, Fischelis and Swain.

Robert P. Fischelis presented the following resolutions:

> *No. 1. Resolved*, that it shall be one of the declared principles of revision in the preparation of the U. S. P. XI, that a definite statement be made in the preface or other suitable portion of the Pharmacopœia that proprietary medicines are not admitted to the U. S. P.
>
> *No. 2. Resolved*, that it shall be one of the declared principles of revision in the preparation of the U. S. P. XI that as many synonyms as are in common use in connection with all drugs and medicines to be admitted, shall be listed in the monographs and in the index of the U. S. P.

Upon motion duly seconded, both resolutions were adopted and ordered submitted to the United States Pharmacopœia convention convening in Washington, D. C., on May 13, 1930.

Chairman Walton made a report for the Committee on Nominations as follows: *Chairman*, Robert L. Swain, Maryland; *Secretary-Treasurer*, M. N. Ford, Ohio.

Upon motion duly seconded, the report of the Committee on Nominations was adopted and the officers declared duly reëlected.

A rising vote of thanks was given the officers for their efforts in behalf of the Conference during the past year.

The question of financing the Conference was raised and after some discussion, Chairman Swain appointed a committee consisting of C. T. Gilbert, of Connecticut; R. P. Fischelis, of New Jersey and F. H. King, of Ohio, to prepare a means of supporting the Conference for the next year.

Chairman Swain expressed his thanks to the members attending and supporting the Conference and then declared the Conference closed.

NEWS BULLETINS OF THE DRUG TRADE BUREAU OF PUBLIC INFORMATION

Director, Robert P. Fischelis, has issued further bulletins, being numbers 28–37, inclusive. Bulletin No. 28 reports the meeting of the N. A. R. D. at Atlantic City; No. 29 the election of officers of the AMERICAN PHARMACEUTICAL ASSOCIATION; No. 30, relates to the Fairchild Scholarship award for 1930; this scholarship was established by Samuel W. Fairchild and provides the sum of $500.00 for graduate work in pharmacy. The winner of the scholarship for this year is Solomon Gershon of the School of Pharmacy, University of Illinois. Bulletin No. 31, deals with the important work of the Committee on the Cost of Medical Care, established several years ago to study related economic aspects. Studies have been made and are being made with the purpose of improving conditions and it is hoped that pharmaceutical organizations will participate as far as possible in aiding this great work. A study of the service of pharmacy is being made by Rufus Rorem and Dr. Robert P. Fischelis, members of the research staff of the Committee on the Cost of Medical Care.

Bulletin No. 32 makes a further report of the N. A. R. D. meeting. Bulletin No. 33 deals with work being carried on under the direction of Prof. C. B. Jordan, with the end in view of giving the wholesaler and manufacturer important information relative to phases of the retail drug business. The purpose of the survey is to be helpful to all divisions of the drug industry. Bulletin No. 34 reports on the development of a curriculum for the four-year course in pharmacy which will soon be the minimum course of the schools of pharmacy affiliated with the Amercan

Association of Colleges of Pharmacy. A general bulletin with reference to the standard pharmacy course is being studied by a Committee under the chairmanship of Dr. Townes R. Leigh. Other members of the Committee are Deans H. C. Biddle, California; J. A. Koch, Pennsylvania; Edward H. Kraus, Michigan; R. A. Lyman, Nebraska.

Bulletin No. 35 explains the purpose of Pharmacy Week and is devoted largely to a comprehensive outline by Chairman Ambrose Hunsberger of the Drug Trade Bureau of Public Information. Bulletin No. 36 relates to the meeting of the N. W. D. A. at Chicago.

PHARMACY WEEK PROGRESS.

We are quite certain that Chairman Ruth, when he presided over the Section on Practical Pharmacy and Dispensing, A. PH. A., in 1924, did not anticipate the wonderful success and progress that Pharmacy Week has made.

We are therefore taking the liberty of reprinting those of the recommendations bearing on Pharmacy Week directly and indirectly, made by Chairman Ruth in his address at the Buffalo meeting. Also parts of an editorial bearing on Pharmacy Week are repeated following the recommendations. (See page 469, June JOURNAL, 1925.)

CHAIRMAN RUTH'S RECOMMENDATIONS RELATING TO PHARMACY WEEK.

"*First:* It is essential to unite all pharmaceutical interests in a great movement for public information and constructive and protective legislation.

"*Second:* A 'National Pharmaceutical Week' could be inaugurated with specially written articles prepared by men of national prominence in pharmaceutical circles, appearing in newspapers and magazines throughout the nation; and speakers from our ranks addressing the Rotary, Kiwanis, Exchange, Lions and similar clubs, Chamber of Commerce, women's clubs, neighborhood clubs and other similar organizations throughout the United States, which are so very instrumental in shaping our national thought. Public health should be the keynote.

"*Third:* Radio broadcasting of a constructive nature, as has already been inaugurated in some of our colleges, should be continued on a more elaborate scale and also carried on by our All-Pharmacy Headquarters when it is complete and functioning, thereby educating the public in our favor.

"*Fourth:* We are like a giant monster that knows not its own strength. A great political organization would result from united pharmacy, which could accomplish any reasonable legislation. The American pharmacy to-day is the greatest political center in the nation, 50,000 petitions could be placed in the reputable pharmacies throughout the country and secure 25 to 50 million signatures, asking for the passing and enforcement of proper legislation to protect public health. A special type of petition could be used for the signatures of physicians, who will soon realize that misuse of the word drug and the indiscriminate sale of medicines is as slowly and surely undermining medical practice and medical prestige as it is that of pharmacy. The medical practitioner has his natural enemies and they are common enemies to both medicine and pharmacy, so it follows that the medical men need our support as surely as we need theirs. We must go direct to the medical profession and ask their support. We don't want to practice medicine, we want to practice pharmacy. Study of the problem shows that the pharmacist is necessary to mankind and if he is to survive, something must be done to protect him. If the politicians fail to support us we can elect politicians who will.

"*Fifth:* Pharmacists and particularly hospital pharmacists should write articles to appear in medical and hospital periodicals, emphasizing the work of their departments, and your Chairman would respectfully recommend to this section that preparations be made for this work as part of the program for the ensuing year.

"*Sixth:* The ASSOCIATION could arrange with magazines of a national circulation, such as the *American Magazine*, to interview pharmacists of repute, thereby securing articles of interest and information to the general public, and furthering the public health and public service points of pharmaceutical service."

PARTS OF AN EDITORIAL, JOURNAL, A. PH. A.

In his address as Chairman of the Section on Practical Pharmacy and Dispensing of the AMERICAN PHARMACEUTICAL ASSOCIATION, at the 1924 meeting, Robert J. Ruth pointed out the value and importance of enlisting all pharmaceutical interests in a campaign to inform the public relative to the mission and service of pharmacy. He outlined the work of "A National Pharmaceutical Week" that would concentrate the thoughts of the public in general on that which pharmacy has done, is doing, and contemplates doing in order to give it better service and protection—to this end the people must be informed of the importance of giving support, by encouragement, to those who seek to raise the standards of pharmacy, whereby public health is protected and the progress of pharmacy stimulated. Education is an essential of progress. We are sometimes impatient because the laity and others do not accept our views, and urge laws to compel them to do those things which we know to be good for them. This is not always the right way. Laws are no stronger than the public opinion that supports them, and public opinion must be created by education.

The address referred to is printed on page 1084 of the November JOURNAL, A. PH. A. (1924), and editorial comment is made on page 886 of the October number. Mr. Ruth gave thoughtful consideration to the subject, realizing that every week should be "pharmacy week" in a pharmacy; he stressed the importance of an educational week during which the public would be informed regarding the mission and service of pharmacy through articles in newspapers and magazines, addresses at Rotary, Kiwanis and other meetings, Chambers of Commerce, Women's clubs, neighborhood clubs, etc., of which public health should be the keynote, and pharmacy's part in this important work, by observance of pharmceutical ethics. Chairman Ruth dwelt at length on ways and means for making "Pharmacy Week" a success and benefit.

The point of paramount importance, in order that "Pharmacy Week" may be a real benefit is to disseminate information relative to pharmacy—that higher educational standards are essential for coöperation with doctors—that improper conduct of a pharmacy represents not only poor service but may endanger health and discredit a neighborhood. Information along these lines seems of greatest importance, and can be communicated by the means that have been suggested. Some may contend that there are too many "days" and "weeks" now, and that they cease to hold the interest of the public, but this is a different proposition—it is to inform and, certainly, a message of health conservation, to keep the neighborhood free from undesirables, conveyed by right methods, will enlist interest.

The pharmacy during the week, which has been fixed as the last week of October, should, in a becoming way, inform the public; the show window—which is "the outward visible sign" of the store—with educational displays that can be comprehended by those who pass, and the inside of the store should also tell the story of pharmacy. All good publicity aids the cause. These general suggestions are sufficient, for each one will develop ideas according to his or her preferences. If pharmacy is to benefit from a "Pharmacy Week" that phase of the store must be the feature of the week; its benefits will be far-reaching if properly conducted.

In the address referred to the suggestion was made that the inter-relation of interests be discussed; that meetings be held with members of the bar, legislators, etc., for the discussion of measures that will be acceptable, enforceable and advance the cause of pharmacy. The interest of educators may also be enlisted, and students directed to pharmacy for their life work.....

PHARMACY WEEK, 1931.

The wonderful progress made by Pharmacy Week is evidenced by the interest shown in the press which to a large extent has been stimulated by pharmaceutical publications, and could not have resulted without the fine coöperation of the latter. It is a matter of impossibility to speak of all the publications that have given such an impetus to Pharmacy Week and it will, therefore, have to suffice to mention only a few of the publications and, at the same time, in an inclusive general way give expression of appreciation for the publicity given in the issues which are dedicated to Pharmacy Week.

The Pharmacy Week number of the *American Druggist* is an outstanding issue of that publication. Every phase of pharmacy has been considered and profusely illustrated. The work of pharmacists and their achievements and their responsibilities are embodied in the many articles which appear in this issue. The pharmacists' relation to the public, the physicians and the

dentists is admirably depicted and a number of historical contributions are included; also comprehensive tabulated digests of preparations in the U. S. P. and N. F. are given. The advertisements, too, in this issue and in other publications, speak of the interest of manufacturers in a coöperative way.

In the Pharmacy Week issue of the *Druggists Circular* there are articles from the pen of government officials. We briefly quote from one by Assistant Secretary of Commerce, Julius Klein: "To the pharmacist, therefore, we owe the development of a precious science that helps to lengthen our lives and shorten our pains. It presides over an extremely vital and sensitive domain—that of our personal comfort and happiness." A letter to the *Druggists Circular* from Arthur W. Hyde, Secretary of the U. S. Department of Agriculture is also reprinted:

"Pharmacy Week this year carries a special significance because of an insidious tendency toward distrust of the drug trade and undermining of the public's faith in the quality of modern pharmaceutical service.

"The professional status of pharmacy has been established through generations of scientific service and through the insistence of the public that the dispensing of drugs be in the hands of those who are not only technically expert but who have a high appreciation of their duty to the community.

"Commercial necessities of the age have caused pharmacies to become also important merchandising agencies, which may have given grounds for the spread in some quarters of a public uneasiness regarding the perpetuation of the high ideals of the pharmaceutical profession.

"Pharmacy is no less a profession than ever, and pharmacists do well to set aside a week in which to remind the public of those pharmaceutical responsibilities which transcend more merchandising.

"Pharmacy Week assures the community of the high professional responsibility behind every pharmaceutical activity and also enlivens the pharmacists' own conceptions of the ethics of their calling."

Aside from these contributions from which quotations have been given the issue contains articles by officers of all the Associations of the pharmaceutical and drug-trade activities. Various articles of the issue contain historical matter of value and point out the relationships of the pharmacist with the laity and related professions. The foregoing publications are the only ones that have come to this office prior to the completion of this issue of the JOURNAL.

ATLANTIC CITY VETERANS' LUNCHEON.

The writer regrets that it was necessary to return to the office before the time of the luncheon. The report, in brief, is a very condensed part of what others have said.

Wilhelm Bodemann, a charter member of the parent veteran druggists' association, opened the meeting as temporary chairman with a silent toast to our departed friends—according to veteran druggists' association tradition. He then decorated the associate members of the C. V. D. A., the anniversaries of whose births occur in September, namely, James H. Beal and Thomas Stoddart.

Inasmuch as twenty-five veteran druggists' associations were represented, the chairman called on the speakers and warned them to be brief, and they were, but each made a happy address. Among those heard from were Fraters Beal, Stoddart, Riemenschneider, Lampa, Bialk, Freericks and Walter D. Adams.

ILLUSTRATIONS OF MEDICINAL PLANTS.

The Office National Des Matiéres Premiéres Végétale Pour La Droguerie (for both medicinal and aromatic plants of France) has issued the 9th of the series of color plates of medicinal plants indigenous to France. The illustrations are good and being in color add great value to the illustrations. The plates are not only excellent productions but have descriptions of the plants together with information relative to their culture, collection, therapeutic properties, etc. The price of a set of eight is 3 francs and may be obtained by addressing the Department above named at 12 Avenue du Maine, Paris XV.

The illustrations of the 9th series are as follows:

Chestnut Oak and other varieties, Hart's Tongue, Polypody, Scale Fern, Senecio, Pyrethrum, Wormwood, Henbane, Anemone, Colchicum.

ASSOCIATION BUSINESS

THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1930–1931.

Office of the Secretary, 10 West Chase St., Baltimore, Md.

LETTER NO. 4.

October 1, 1930.

To the Members of the Council:

42. Publication of Supplements to N. F. No comments on this recommendation from the Committee on National Formulary have been received. (See Council Letter No. 2, page 923 and Letter No. 3, page 1024.) Comments are again invited so that a vote may be taken.

43. Local Secretary for 1930–1931. Motion No. 9 (see Council Letter No. 3, page 1024) has been carried and Mr. Grommet has been elected.

44. Headquarters for 1931 Meeting. Motion No. 10 (see Council Letter No. 3, page 1024) has been carried and the Columbus Hotel, Miami, Florida, will be the official headquarters.

45. Annual Joint Meeting Executive Committee of the N. A. R. D. and the A. Ph. A. A very interesting joint meeting of these committees (see Council Letter No. 3, page 1024) was held at the Ambassador Hotel, Atlantic City, N. J., on Monday, September 15, 1930, during which a number of matters of mutual interest to the two associations were considered. Messrs. Christensen, Hilton, Eberle, LaWall, DuMez and Kelly represented the A. PH. A. Following the meeting, the members of both committees were entertained at luncheon by the members of the Committee on Arrangements for the N. A. R. D. Convention.

46. Use of Text of the N. F. V. Motion No. 11 (see Council Letter No. 3, page 1024) has been carried and Professor Fuller has been so advised.

47. Price of Collective Index, 1903–1925. Motion No. 12 (see Council Letter No. 3, page 1024) has been carried and the price of the Index in future will be $6.50.

48. Election of Members. Motion No. 13 (see Council Letter No. 3, page 1025) has been carried and applicants numbered 57 to 65, inclusive, are declared elected.

49. Associate Members. At the recent annual meeting the following article was added to Chapter IX of the By-Laws:

> "Article VIII. Associate Members. The Council may provide for the election of associate members and may fix the annual fee to be paid by such members. Associate members shall not be entitled to vote at the annual meetings or to participate in the election of the general officers of the ASSOCIATION."

(*Motion No. 14*) *It is moved by Christensen that bona-fide students in schools or colleges of pharmacy that are incorporated or are connected with incorporated colleges or universities, may become associate members of the Association by making application and being elected by the Council in the same manner as members; that every associate member shall pay in advance to the Treasurer the sum of five dollars as annual dues and by neglecting to pay said contribution for six successive months may be dropped from the roll of associate members; and that associate members shall receive the Journal and Year Book.*

50. Student Branches. At the recent annual meeting, the following article was added to Chapter VII of the By-Laws:

> "Article VI. Student Branches. Student Branches may be established at such places and upon such terms and conditions as the Council shall prescribe. The members of Student Branches shall be associate members of the ASSOCIATION."

(*Motion No. 15*) *It is moved by Christensen that student branches may be formed in incorporated schools and colleges of pharmacy or those connected with incorporated colleges or universities whenever it may appear that fifteen bona-fide students in such school or college will participate, and petition the Association, with the approval of said school or college, for the formation of a student branch bearing the name of the school or college; that if within any one calendar year, any student branch shall fail to hold at least two stated meetings the proceedings of which are printed in the Journal, the branch shall be deemed to be suspended; and that all active or voting members of a student branch must be associate members in good standing.*

51. Student Branches. At the recent annual meeting the following article was added to Chapter VI of the By-Laws:

"Article VII. Fees to be collected from Members of Student Branches. The Council may authorize a rebate to student branches of a portion of the fees paid by the members of such branches, but all such rebates shall be devoted exclusively to the promotion of the activities of such branches, and any portion of such rebate remaining unappropriated at the end of the college year shall be returned to the treasury of the ASSOCIATION."

(*Motion No. 16*) *It is moved by Christensen that the sum of two dollars of each five dollars collected as annual dues from associate members be rebated under the conditions laid down in Article VII of Chapter VI of the By-Laws, to the Student Branch of which the associate member is a member.*

E. F. KELLY, *Secretary.*

REGIONAL MEETING OF THE MARYLAND ASSOCIATION.

The regional meetings of Maryland Pharmaceutical Association have proven their value. The seventh meeting, held in Hagerstown, October 13th, was attended by more than sixty members. These semi-annual sessions develop interest and result in a more active membership, because they bring the members into closer touch with the Association's activities and offer the opportunity for conference of the officers. Interesting papers were read by L. S. Williams, H. S. Harrison, H. C. Kinner, L. V. Johnson, Geo. W. Colburn, F. C. Purdum, A. G. DuMez and L. M. Kantner. Addresses were made by Mayor Musey, Henry Holzapfel—member of Board of Regents, University of Maryland, and A. L. I. Winne, Secretary of Virginia Board of Pharmacy. Among the visitors present were presidents of other associations—Harry J. Pettyjohn, Delaware; Paul Pearson, District of Columbia; G. E. Haller, of Virginia. H. R. Rudy presided, and the hospitalities of the Hagerstown pharmacists made a profitable day most enjoyable.

A purpose of this mention is to suggest consideration of the plan to other associations.

ALCOHOL ADVISORY COUNCIL ORGANIZES.

Permanent machinery for contact between the Bureau of Industrial Alcohol and interested industries was perfected Oct. 3rd, at the first meeting of the Industrial Advisory Council recently appointed by James M. Doran, Commissioner of Industrial Alcohol. All but two of the sixteen members were present.

The tentative draft of the new regulations on industrial and medicinal alcohol was discussed in general, and sub-committees were appointed; machinery was created for conveying to the bureau detailed suggestions about specific regulations as they affect individual interests represented on the council. Chairman of the Council, S. L. Hilton, is the representative of the A. PH. A.

Officers elected are: *Chairman*, Henry S. Chatfield; *Vice-Chairman*, A. Homer Smith; *Secretary*, Dr. Harrison E. Howe, of the American Chemical Society.

The new regulations are drawn to make it desirable for honest business men to obey the law, Commissioner Doran told the council, and he asked the council to preserve harmonious understanding and coöperation between the Government and industry. In this connection, he said:

"Men of affairs in science and industry are rendering a fine public service by giving their time and ability in assisting the Government in its efforts to promote fair administration of the laws affecting legitimate business.

"The Government welcomes the advice of industrial leaders, not for the purpose of relaxing regulations, but with a view of applying regulations with greater effectiveness to the end that legitimate business will thereby be promoted and safeguarded. With that thought in mind, your views will always be given careful consideration.

"The Industrial Advisory Council can render invaluable aid to the Government by preserving harmonious understanding and cooperation with the industrial users of alcohol and other nonbeverage liquors, to the end that all legitimate commercial requirements will be met, and that criminal operations wherever they may be manifested may be effectively eliminated."

SOCIETIES AND COLLEGES.

NATIONAL ASSOCIATION OF RETAIL DRUGGISTS.

The meeting of the National Association of Retail Druggists was held at Atlantic City, September 15th to 19th. The address by President Thomas Roach, was optimistic. He stated that the drug business had perhaps suffered less than any other activity by the depression, and accounted for this in that the drug business does not increase excessively during prosperous times and the loss is correspondingly less than of the other activities when there is a depression. He stressed the importance of pharmacy and gave consideration to all the important activities of the Association.

Among the outstanding addresses of the meeting were—by Congressman Kelly on the Capper-Kelly Bill, who assured the members that with their full support the passage of the bill was assured, at an early day; Dr. J. H. Beal, dealing with the [illegible] of the Pharmacopœia; by Dr. Julius [illegible]m, Dr. James M. Doran, Prof. Paul C. Olsen, M. P. Gould, Clyde Eddy.

The following officers were elected for the ensuing year:

President, Julius H. Riemenschneider, Chicago; *First Vice-President*, J. W. Dargavel, Minneapolis; *Second Vice-President*, W. M. Rheineck, Milwaukee; *Third Vice-President*, James T. Dumas, Foley, Ala.; *Secretary*, Samuel C. Henry, Chicago; *Treasurer*, Charles Ehlers, Cincinnati, Ohio. Members of the Executive Committee—F. R. Peterson, Portland, Ore.; Thomas Roach, Oklahoma City; Denny Brann, Des Moines; Bernard M. Keene, Indianapolis; Ambrose Hunsberger, Philadelphia; Samuel C. Davis, Nashville.

The purposes of the resolutions adopted, in brief, follow:

The Vestal Bill was opposed in its present form; it assesses a fine of at least $250.00 upon conviction of a person playing copyrighted phonograph records. An amendment has been prepared.

Opposition was voiced against the discontinuing of listing pay stations by the telephone company, also more satisfactory arrangements as to commissions is asked for.

Hearty endorsement was given to manufacturers for advertising the services of the independent retail pharmacists.

The work of the Druggists' Research Bureau was commended. A vote of thanks was tendered W. K. Henderson of "Hello World Fame." Attention was directed to the successful work the Merchants and Consumers Protective Alliance is doing.

Support was voted the National Drug Survey in St. Louis. The N. A. R. D. was urged to continue its labors in behalf of reasonable regulations for the enforcement of the Food and Drugs Act; also that everything possible be done to expedite the chain store investigation.

The incoming president is to appoint a Committee on Pharmacy Endowment. Further reference to this resolution is made in the editorial columns.

Objection was voiced against the sales of medicine in any store not under the supervision of a registered pharmacist. The work of law associations, whose aim and work are for the suppression of crime and a full p[illegible]ment of criminals, was endorsed. The press was again asked to discontinue the use of the word "drug" where the term "narcotic" should be applied. It was resolved that pharmacy should be relieved of the full responsibility in dispensing liquor prescriptions for medicinal purposes. The Bureau of Industrial Alcohol is to be petitioned to amend the regulations allowing all pharmacists operating under an H or I permit to keep one pint bottle of whisky for legitimate prescription use, amounts used to be designated on monthly reports.

Manufacturers of proprietary medicines were asked to use greater care in the distribution of their samples; also, limiting to a certain extent intensive exploitation of trade-mark and proprietary items. Hearty approval was given to the activities in behalf of an intensive U. S. P. and N. F. campaign, and that the official preparations of the U. S. P. and N. F., and of New and Nonofficial Remedies be at all times available in the prescription departments.

Enforcing bodies in each state are to be petitioned to investigate whether drug departments over which they have jurisdiction are complying with pharmacy laws, and if registered pharmacists are in charge. A protest is to be filed with the Post-Office Department against the increased rate in first class mail and instead the increase is to be placed on parcel-post matter.

Delegates were asked to enlist the active coöperation of all independent retailers, wholesalers and manufacturers in educating the consuming public to the need of the enactment of the Capper-Kelly Bill. A copy of Representative Kelly's address on the Capper-Kelly Bill is to be placed in the hands of independent business men; strong effort is to be made in behalf of the Capper-Kelly Fair Trade Bill. This action is emphasized in three separate resolutions.

The importance was stressed and the necessity of providing the personnel of the Army and Navy with the same quality of pharmaceutical service now available to civilians and that pharmaceutical personnel be selected from graduates in pharmacy of recognized colleges.

The Pharmacy Corps Bill was again endorsed. It was urged that the commissioned medical service in the Veterans' Bureau include pharmacists in the commissioned personnel; that a representative pharmacist be included in the membership of the Advisory Council; that men with pharmaceutical experience be appointed to Government positions where such training is essential.

Attention was directed to pharmaceutical manufacturers' discount; sales to boards of health are to be looked into that find their way back into the channels of trade.

Pharmacists are urged to lend full support and coöperation to the work of revision of the U. S. P. and that a greater interest be taken by them so that retail pharmacy may be better represented in the U. S. P. Convention and on the Committee of Revision.

Coöperation was voted the New Jersey Pharmaceutical Association, the Atlantic County Drug Club, leading manufacturers and the management of the Atlantic City Auditorium to aid in staging a suitable Public Health Exhibit to carry on an educational program during the period of said fair.

Continued affiliation and coöperation with the National Drug Trade Conference, the AMERICAN PHARMACEUTICAL ASSOCIATION, the Drug Trade Bureau of Public Information, and its contact with the Chamber of Commerce of the U. S. A. was voted.

Purple and gold were selected as the official colors of the N. A. R. D.

The appointment of Dr. James M. Doran met with approval and coöperation and support was pledged to the Secretary of the Treasury, the Commissioner of Industrial Alcohol, in the performance of their task of administering the permissive phases of the National prohibition law.

The final resolution was a comprehensive one and conveyed thanks to those who arranged the program and made the meeting a success.

NEW YORK BRANCH A. PH. A.

The opening meeting of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION for this season was held October 13th at the College of Pharmacy, Columbia University. It was a Pharmacy Week evening, presided over by Editor Herbert R. Mays. A number of interesting talks were made, among them one by Robert J. Ruth, General Chairman of Pharmacy Week. The message on National Pharmacy Week by President H. C. Christensen, was distributed and made use of for giving publicity to the annual event.

A PHARMACEUTICAL DISPLAY AT THE MEETING OF INDIANA MEDICAL ASSOCIATION.

Indiana Medical Association held its recent annual meeting at Fort Wayne. Members of the staff of the Purdue University School of Pharmacy prepared a representative assortment of official preparations for display at convention hall. Along with the latter, products obtained from bituminous coal were also displayed.

A great interest was exhibited, and the members of the staff of Purdue University and of the Indiana State Pharmaceutical Association were congratulated by the members of the Indiana Medical Association. One of Indiana's prominent surgeons stated that the Purdue display was the most outstanding of any at the meeting, both from an educational and instructive standpoint. Such coöperation will develop into great value; it affords the opportunity of acquainting physicians with U. S. P. and N. F. preparations, New and Nonofficials and preparations of the A. PH. A. Recipe Book.

PERSONAL AND NEWS ITEMS.

MARVIN R. THOMPSON ELECTED EMERSON PROFESSOR.

In 1927, Captain Isaac E. Emerson made provision for an endowment—(Professorship in Physiological Drug Testing) for the School of Pharmacy, University of Maryland—valued

at about $75,000. The chair has been filled by the election of Marvin R. Thompson, who will have charge of the courses in Pharmacology, Toxicology and Therapeutics given to students in Pharmacy, as well as the work in Physiological Drug Testing. Professor Thompson received the Ph.C. degree from the University

MARVIN R. THOMPSON.

of Minnesota; B.Sc. from George Washington University, and he also pursued special studies under Drs. Hirschfelder, Edmunds and Nelson.

Since 1927, he has been Associate Pharmacologist, Pharmacological Laboratory, U. S. Department of Agriculture, and for the past two years in charge of the course in Materia Medica, Pharmacology and Therapeutics in the School of Pharmacy, George Washington University.

Professor Thompson presented a comprehensive paper on the Pharmacology of Ergot to the Scientific Section, A. PH. A., published in the JOURNAL, as a series, beginning in the November number, 1929; this gained for him the Ebert prize for 1930.

J. K. Lilly has established two fellowships in Purdue University School of Pharmacy, each carrying an annual stipend of $600. Miss Alice Hayden, University of Washington, has been selected for one, and the subject of her research is "Chemical Constituents of the Oils of Ma Huang." The other fellowship for this year goes to Harold Fisher, of South Dakota State College of Pharmacy, whose subject is "The Precipitates in Galenicals."

Dr. R. R. Spencer of the Public Health Service has won a gold medal of the American Medical Association in recognition of developing a vaccine and for his work on "spotted fever."

John C. Krantz, Jr., contributed an article to the *Druggists Circular* on "Pharmaceutical Progress Since the Turn of the Century." He states that during the last thirty years haphazard methods have changed to scientific procedures, guess work to mathematical accuracy, and the empirical art to scientific exactitude.

F. B. Kilmer states that pharmacy is a profession guided and controlled by a system of principles that rules its practices on a code of ethics, governs the conduct of its followers more firmly than any of the laws which govern human society. The safety, the well being, the welfare of the community lie in the hands of the pharmacist.

J. G. BEARD.

President, Conference of Pharmaceutical Association Secretaries.—See Editorial Columns.

Secretary C. G. A. Harring, of the Conference of Pharmaceutical Secretaries, was born in Copenhagen in 1870. He received the degree of pharmaceutical science at the College of Pharmacy in Stockholm in 1890, after which he came to this country and registered in Massachusetts.

He was part owner of the European Pharmacy in Boston and is now member of the firm of Harring and Teele in Dorchester.

He is a past-president of Massachusetts Pharmaceutical Association and of the Boston

Association of Retail Druggists and is serving his third term as secretary of the Massachusetts State Pharmaceutical Association.

CARL G. A. HARRING.

The *Porto Rico Pharmaceutical Review* has begun an English section, which makes that publication of greater interest in this country and also among the English speaking pharmacists of Porto Rico. We consider this an important undertaking and wish the best of success for it.

Henry Colle, in the *American Pharmacist,* for September 1930, gives an historical account of the origin and development of the American Registered Pharmacists Association. The aim of the Association is to aid in the development of better trained and qualified employees. The history is dedicated to the Association's Executive Director—Fred A. Lion.

The *Pennsylvania Pharmacist* and the *Carolina Journal of Pharmacy,* for October, carry the proceedings of the respective state associations, of which they are the official organs. *Merck's Report* for October is largely devoted to the spirit of "Pharmacy Week;" we quote from the number: "In the magic of the light from this lamp the onlooker will vision the Pharmacist as a member of an old and learned profession, exacting in its requirements; a man trained to blend his skill with that of the Physician in time of sickness; to take a great part in the promotion of public health; to serve his community as one with responsibilities and duties far greater than those of a merchant."

Speaking of President-Elect Walter D. Adams, the *Southern Pharmaceutical Journal* for October, says: "He is just the sort of quiet, unassuming, self-effacing gentleman in a gray suit, whom character readers recognize immediately as the leader in his line, whatever it happens to be . . . who by consistent endeavor and uncomplaining toil arrives suddenly at the pinnacle of all honor, surprising nobody in the least, except himself. . . ."

The *Southeastern Drug Journal* for October says editorially: "With the eyes of American pharmacy turned toward the South, its leaders and its pharmaceutical associations, to every pharmacist in this great section comes the responsibility and obligation to give every possible support to the A. PH. A. in all its worthy projects, to participate in the activities of the national body, to attend the convention in Miami next year, and to show by every possible means, the interest of Southern pharmacists in the national body."

Harry J. Anslinger, who has been Acting Narcotics Commissioner was named Commissioner by President Hoover on September 23rd. He is a native of Altoona, Pa. In 1927 he attended the London conference for the prevention of smuggling, and the following year he was sent to the Congress against Alcoholism in Antwerp. While still in the State Department he assisted the Treasury Department in agreements with other nations to prevent the smuggling of liquor into this country, and later he was transferred to the Bureau of Prohibition, where he headed the division of foreign control. For a year prior to the transfer of prohibition enforcement to the Department of Justice Mr. Anslinger served as Assistant Commissioner of Prohibition.

General Smuts, of South Africa, is leaving on a botanical tour through Rhodesia, the Belgian Congo and Tanganyika as far as Lake Tanganyika. He will be accompanied by a Government representative, M. K. Hutchinson, botanist from the herbarium of the Royal Botanical Gardens at Kew, and by Dr. I. B. Pole-Evans, chief of the division of plant industry of the Union.

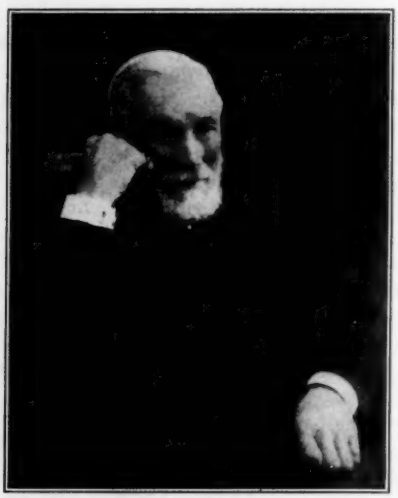
Robert S. McKinney, of Taneytown, Md., has been elected Honorary President of the Alumni Association of the School of Pharmacy, University of Maryland, from which institution he graduated in 1882. He has been a member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1898.

OBITUARY.

EDWARD MORELL HOLMES.

Edward Morell Holmes was born in January 1843, at Wendover, England. He died September 10, 1930, at his home at Sevenoaks, Kent, England, aged 87 years.

It is a matter of impossibility in these columns to present a sketch which would approximate the credit that should be given the deceased; an attempt was made, in a brief way, in the March number of the JOURNAL for 1923, to speak of the work which Mr. Holmes had accomplished. He was a remarkable man in the field of his endeavor and an authority in the studies he pursued, as botanist, pharmacognosist, horticulturist, entomologist, conchologist, etc.



E. M. HOLMES.

During his early years he was actively connected with pharmacy in England until 1872, when he was appointed Curator of the Museum of the Pharmaceutical Society, and served from that date until 1922, when he was retired on a pension with the rank of Emeritus Curator.

For several years he was lecturer on Materia Medica at the Pharmaceutical Society School and served as botanical referee for the Pharmacopœial Committee of the General Medical Council during several revisions. He was also lecturer on Botany to the Westminster Hospital Medical School. For other studies in which Mr. Holmes was distinguished we refer again to the prior sketch.

He held membership in many scientific societies of Europe and was elected an honorary member of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1899, and in the same year he was elected president of the British Pharmaceutical Conference. He was awarded the Flueckiger and Hanbury medals.

The *Pharmaceutical Journal and Pharmacist*, of September 20, 1930, in speaking of him editorially, states, "The Pharmaceutical Society of Great Britain, in whose service so long a period of Mr. Holmes' life was spent, has in its Materia Medica Museum an enduring monument to his creative and constructive school and art and on the botanical side his researches on the botanical source of a number of important drugs have served to shed new light on many problems of origins which had theretofore baffled investigators. During the course of his long life he contributed copiously to the literature of especial subjects and his articles on drugs in successive editions of the 'Encyclopædia Britannica,' are models of their kind. Even the most superficial survey of Mr. Holmes' literary output fills one with admiration even more for its quality than for its bulk."

In the closing paragraph of the same article the Editor states that "there was something heroic in the fortitude and serenity of his attitude and behavior in these circumstances." The circumstances referred to were the result of an unfortunate accident, several years ago, by being run down by a motor wagon causing loss of a limb, and with it he suffered severely with rheumatoid arthritis.

The last letter the writer of this sketch had from him was in July 1928, when he expressed his regret because of his inability to prepare an article which had been requested, as it was not possible for him to go to the Libary for certain references he wanted to include. In the letter he exhibited his interest in professional pharmacy, which he always felt should be distinct and separate from the business side of pharmacy.

All British publications indicate the place of the deceased in the esteem and regard of friends and men in the sciences to which the deceased gave much. The tributes so far published, cover many pages, all of them testifying to his worth and the value of his work. Quoting from one of these comments, "There is still a common belief that the man

of science, even when not a downright recluse, is a heartless, unemotional being, to whom family and other ties are a subsidiary consideration. Needless to say this is falsified in almost every case and it was contradicted in a supereminent degree by the personality of Mr. Holmes, than whom it would have been impossible to find a friendlier or more sympathetic spirit in all the relations of life."

The AMERICAN PHARMACEUTICAL ASSOCIATION highly regarded his membership and is fully appreciative of the honors which came to this Honorary Member. Anyone acquainted with the extent of his work must marvel how he accomplished so much. Aside from the British Pharmaceutical Museum, his collections have found place in various Universities, British Museum, Kew, Oxford, Cambridge, Glasgow, Dublin, Liverpool, Manchester, Edinburgh, Aberdeen, Kiel, Paris, Harvard, Mason College, University College, Nottingham, etc., etc.

Mr. Holmes is survived by his widow and sympathy is expressed to her. Mrs. Holmes is deeply interested in the sciences to which her husband was devoted.

SOLOMON K. KAHN.

Solomon Karl Kahn, aged 58 years, of Ambler, Pa., chief chemist for John Wyeth & Bro., Inc., for more than thirty years, died September 14, 1930, in Hahnemann Hospital, after a brief illness. He became a member of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1905. Dr. Kahn was a native of Alabama, and studied abroad, receiving his degree in chemistry from Heidelberg University.

The deceased is survived by two sisters, residing in Ambler, and a brother, Leo Kahn, of Mobile, Ala. Burial was made in Mobile.

GEORGE S. DAVIS.

George S. Davis, an incorporator of Parke, Davis & Co., died October 1st, aged 85 years. Mr. Davis had been in poor health for a number of years, and retired from active business efforts more than thirty years ago. He was a native of Detroit, and began his business career as a drug clerk; later, he engaged in the wholesale drug business; in 1887, he associated himself with the pharmaceutical manufacturers—Duffield, Parke & Co.; after the retirement of Dr. Duffield the company incorporated under the name of Parke, Davis & Company, with Mr. Davis occupying the position of general manager. Mr. Davis is survived by his widow.

GEORGE ROBERT MERRELL.

George R. Merrell, member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1901, died at his home in St. Louis on October 2nd, aged sixty-one years. Mr. Merrell's father, Jacob S., founded the business with which the deceased was connected since 1886. His earlier education was received in St. Louis in the public schools and Smith Academy. He graduated from the St. Louis College of Pharmacy, in 1889. He was a former president of the St. Louis College of Pharmacy and an Honorary Member of its Board of Trustees.

Mr. Merrell's activities in the drug company of which he was the head, led him from one position to another, officiating as treasurer and vice-president, and after the death of Colonel Walbridge he became its president. He was an active figure in the National Wholesale Druggists' Association, serving on the Board of Control for many years and elected Chairman in 1918.

Mr. Merrell and Alice Bentley Atkins were married in St. Louis, April 12, 1893. They had five children: Spencer Atkins, George R., Jr., Charlotte Marquis, Ruth Porter and Alice Jane.

HENRY LEINBACH KLOPP.

Henry L. Klopp, son of Henry and Sarah Klopp, was born on February 7, 1864, at West Leesport, Pa., and died on September 26, 1930, at his late residence, in Philadelphia.

Mr. Klopp received his early education in the public schools of Kutztown, and came to Philadelphia in 1887, entering the employ of Samuel H. Shingle. He then matriculated at the Philadelphia College of Pharmacy and was graduated with the class of 1889, the subject of his thesis being: "Observations in Pharmacy."

In 1898, he purchased the old established pharmacy of Charles W. Hancock at 3421 Spring Garden Street, where he soon won the confidence of the medical profession for his ability as a pharmacist, and the affectionate regard of his customers for his sterling worth.

Mr. Klopp was a member of the Philadelphia Association of Retail Druggists, of the Pennsylvania Pharmaceutical Association and of the AMERICAN PHARMACEUTICAL ASSOCIATION. He became a member of the latter organization in 1913.

Henry L. Klopp was a man among men. A pharmacist of the old-school, he loved his profession and exemplified its highest ideals. He gave the best that was in him, in daily, unremitting service for the relief of sick and suffering humanity, and he brought honor to himself and his craft.

The deceased was a member of the Masonic bodies. He is survived by his wife, C. Mildred Klopp, and a daughter, Sarah.—J. W. ENGLAND.

AXEL E. CARLSON.

Axel E. Carlson, President of the Nebraska Pharmaceutical Association in 1924, member of the AMERICAN PHARMACEUTICAL ASSOCIATION, also member of the Nebraska Board of Examiners, died at his home in Dannebrog, Nebr., September 3rd.

A report is made in the Department of the National Association Boards of Pharmacy of this issue.

The deceased was 40 years of age and had been engaged in the drug business at Dannebrog for twenty-one years. He was a member of the Masonic body. He is survived by his widow and one daughter.

We are advised of the death of Charles Beyschlag of Lacrosse, Wis., member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1880.

BOOK NOTICES AND REVIEWS.

Allen's Commercial Organic Analysis. A treatise on the properties, modes of analysis and proximate analytical examination of the various organic chemicals and products employed in the arts, manufactures, medicine, etc., with concise methods for the detection and estimate of their improprieties, filtrations and products of decomposition. Volume VIII, Editor, C. Ainsworth Mitchell, of the *Analyst*. Publishers, P. Blakiston's Son & Co., Inc., Philadelphia, Pa. Price $7.50.

This notice relates to Volume VIII dealing with glucosides, non-glucosidal bitter principles, enzymes, putrefaction bases, animal bases, animal acids, the cyanogen compounds the proteins, the digestion products of proteins. The following contributors have been at work on this revision: Julius Grant, G. Barger, K. George Falk, G. H. Buchanan, Philip B. Hawk, Olaf Bergeim, S. B. Schryver and H. W. Buston.

Fifty more pages have been added in this revision. The Editor says that the ideal arrangement would have been to have all sections on proteins in this volume. Want of space has prevented this so that some sections dealing with certain classes of proteins and substances containing proteins have had to be held over for Volume IX.

The work in general has been reviewed on a number of occasions and, undoubtedly, the high quality of this standard has been maintained. Dr. Julius Grant has contributed the monograph on glucosides covering seventy-eight pages. The division on non-glucosidal bitter principles has also been re-written and revised by Dr. Grant; also the one on enzymes.

The chapter on putrefaction bases has been prepared by Dr. G. Barger. The animal bases are treated by Dr. K. George Falk. In nearly two hundred pages the animal acids have had the consideration of Dr. Philip B. Hawk and Dr. Olaf Bergein. Dr. G. H. Buchanan has re-written and revised the monograph on cyanogen compounds. The proteins present the last work of Dr. S. B. Schryver and the monograph was completed by Dr. H. Buston. Under the same contributors the last division of this volume has been prepared. A more extended reference to this well and favorably known work is hardly necessary; this volume, like the preceding, is indispensable for the analyst and chemist of laboratories including those of pharmaceutical manufacturers. In this volume, including the Index, there are nearly eight hundred pages. The mechanical work of printing, binding and paper is up to the usual quality of the publishers.

Pharmaceutical Mathematics. By EDWARD SPEASE, professor of Pharmacy and dean of the School of Pharmacy, Western Reserve University. Published by McGraw-Hill Book Co., Inc., New York. Price $1.75. This is one of the series of the McGraw-Hill Publications in Pharmacy; the other two so far published are "Qualitative Analysis for Students of Pharmacy and Medicine," by Charles B. Jordan, and "Pharmaceutical Therapeutics," by Eldin V. Lynn.

The book of which notice is here given is in-

tended as a textbook to be used in teaching the mathematics of pharmacy. The author has used the text in class room instruction; that arrangement is followed in the book. In the first chapters consideration is given to Prescription Forms, including a discussion, use and values of the different systems of weights and measures; succeeding chapters deal with percentage and dosage; three divisions are devoted to specific gravity; two relate to the mathematics of dispensing and manufacturing in quantity. Solution is given consideration in several of the chapters, and application is made of dilution, chemical combination, effect of temperature, and methods for making calculations. The last chapters of the book relate to problems that come up in business, figuring discounts, profit, loss, etc.

While, as stated, the book is intended for the class room, in making pharmacy students and nurses acquainted with applied mathematics in their practice, it should find use in the drug store. The importance of mathematics cannot be too strongly impressed; the misplacement of a decimal point may be the cause of death, permanent injury, and seriously affect the life of the individual who makes the mistake.

A Treatise on Microscopic Pharmacognosy. By WILLIAM MANSFIELD, A.M. Phar.D., Ph.G., Albany, N. Y. John Wiley & Sons, Inc., New York.

The plan of this book is very similar to Dean Mansfield's previous publication "Histology of Medicinal Plants;" *i. e.*, a series of plates with a page of accompanying explanation of the plates. This type of textbook is not entirely novel, but is decidedly unusual among texts. Professor Mansfield used much the same idea in his publication of several years ago "Squibb's Atlas of Pharmacognosy," in which he prepared a series of photographs of vegetable drugs, accompanying each plate with a page of description of the drug.

While this style of textbook is novel, yet it may be very practicable, provided that sufficient oral instruction be given in the teaching. It is very evident that in this method of instruction, the text does not present anything in the way of theory, tabulation, correlation, nor any matter pertaining to the subject outside of what can be presented in the drawing.

Pharmacognosy, in its broader sense at least, embraces not only the actual structure of the drug, but a study of its constituents, its purity, quality and strength, its adulterants and its association and correlation with other drugs. Many of these points can be dealt with microscopically. Therefore, it may be said that a text which covers only the microscopic structure of the drug is not as comprehensive as a text on microscopic pharmacognosy might be made.

The drawings are well made and accurate and the descriptive text, while short and condensed, is clear and accurate. It is a matter worthy of note that American textbooks on pharmacognosy, as a whole, do not present the exquisite accuracy of line and perspective in their drawings so often seen in German works on this subject. It is true that this beautiful drawing takes a great deal of time, not only in the actual drawing itself, but in the preparation of the mounts and in the study of these mounts under the microscope. After years of study of the work done by Tschirch and by Moeller I must admit that I have never found an inaccuracy in a drawing or description of their work. This, perhaps, I cannot say of any American author. Whether this extreme accuracy and beauty of the drawing is worth while for textbooks is a question. Perhaps the idea to be conveyed is just as well conveyed by work that has not cost quite so much in time and energy and skill. E. N. GATHERCOAL.

The Condensed Chemical Dictionary. Compiled and edited by the editorial staff of the Chemical Engineering Catalog; Second Edition, completely revised and enlarged under supervision of Thomas Gregory, Editor, and Isabelle M. Welch, Assistant Editor. Published by the Chemical Catalog Company Inc., New York. Price $10.00.

The Dictionary has as a purpose the supplying of information to those whose needs are for brief definitions of chemicals and chemical products. The extent of these terms may be indicated in stating that there are nearly five hundred 2-column pages, of about 80 lines to the column. The care exercised in presenting authentic information is shown by acknowledgments of coöperation of a very large number of chemists and of laboratories, and much of this information is not available in literature; added information was obtained from the references, books and other publications, the listing of which requires four pages. These facts are mentioned to give an idea of the comprehensiveness of the Dictionary. The fact that more than 16,000 copies of the

first edition were sold speaks for the value of the Dictionary, and the large number of co-operators who make use of it answers the purpose of a lengthier review. Reference should be made to other information contained in the book; the following mention is made: "Transportation of explosives and other dangerous articles; table of atomic weights; weights and measures; metric equivalents; equivalent temperature readings; specific gravity equivalents in Baumé and other hydrometer readings; specific gravities of solutions of acids and alkalies, alcohols; and other tables." The Dictionary is the important and major part of the book and commends itself.

Eat and Keep Fit. Preventing and controlling overweight, acidosis and constipation. By LYMAN F. KEBLER, M.D., M.S. Introduction by Dr. Harvey W. Wiley. Dedicated to his wife, Ida Elizabeth Kebler. 302 pages; published by the author. Price $3.00.

The author is well and favorably known to our members. He was former Government specialist in foods, drugs and medical mail-order schemes, and is now Medical Director of Tennessee Products Corporation, and of health interests of Bowman Biltmore hotels, etc.

The author states that "The aim in this book is to present, in popular form, certain information on foods and nutrition; to keep many thousands of obese persons from falling for the numerous harmful obesity—drug cures and mechanical schemes abroad; to warn women, against abusing their bodies and undermining their health by various food and drug fads; to advise them in matters of diet and exercise and how to prevent and control overweight, constipation and acidosis; to enable them to select suitable diets that make for health, efficiency and better food habits."

A good commendation for the book comes from the pen of the late Harvey W. Wiley, whose department in *Good Housekeeping* (until his demise) is known to all readers; we quote the last paragraph: "Just now, however, I desire to introduce the present work of Dr. Kebler with a word of commendation. The author has followed strictly scientific principles in showing how in a reasonable degree food can be consumed without any unnecessary increase in weight. He has also shown how to decrease, without threat to health, any superabundance of adipose tissue. The problem has been attacked from all angles and with ability and success. The reader may be assured that there is no 'faddist' statement in the text. Good and sufficient reason for the advice he gives is found in all parts of the volume."

The author has drawn on his knowledge and experience relating to the subject and also on that of other authorities; the book is divided into 19 chapters and an index of 24 pages is convenient for reference.

Annual Survey of American Chemistry, Volume IV, July 1, 1928 to December 31, 1929. Prepared under the auspices of the Division of Chemistry and Chemical Technology of the National Research Council, James E. Mills, *Chairman.* Edited by Director Clarence J. West, Research Information Service, National Research Council. Published by the Chemical Catalog Company, Inc., New York. Price $4.00; 549 pages, cloth.

It will be noted that the survey represented by Volume IV extends over a period of eighteen months, so that succeeding volumes may apply to the calendar year. No critical review is attempted—the Foreword states that "the object of the survey is to present throughout a period of years a complete review of American chemistry. Therefore, in accordance with a policy previously adopted when the amount of work published in a given field does not warrant a review each year, that chapter is omitted and some other field is selected for review. New authors are also selected (from time to time) in order to obtain a varied point of view in the subject matter presented."

The contributors are well and favorably known in their respective fields; 43 subjects are presented: Colloid chemistry is reported on by Ross Akien Gortner; photochemistry, by George B. Kistiakowsky; pharmaceuticals, by Ernest H. Volwiler; the vitamines, by H. C. Sherman; insecticides and fungicides, by R. C. Roark, etc., etc.

(*To be continued*)

NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION.

The National Wholesale Druggists' Association held its 56th annual meeting in Edgewater Beach Hotel, Chicago, October 12th to 16th. The elaborate program was carried out and much important business transacted. Report of the meeting will be made in the next issue.